June 14, 2019

VIA FOIAONLINE.REGULATIONS.GOV
U.S. Environmental Protection Agency

Re: Freedom of Information Act Request: EPA Compliance with NW Pesticide BiOps

Dear FOIA Officer:

This is a request under the Freedom of Information Act, 5 U.S.C. § 552, *as amended* ("FOIA"), from the Center for Biological Diversity ("Center"), a non-profit organization that works to secure a future for all species hovering on the brink of extinction through science, law, and creative media, and to fulfill the continuing educational goals of its membership and the general public in the process.

REQUESTED RECORDS

The Center requests from the U.S. Environmental Protection Agency ("EPA") Headquarters:

1. The records of EPA's implementation of Reasonable and Prudent Alternatives ("RPAs"), Reasonable and Prudent Measures ("RPMs") and Conservation Recommendations found in the biological opinion "Environmental Protection Agency's Registration of Pesticides Containing Diflubenzuron, Fenbutatin Oxide, And Propargite." Attachment A (EPA's Registration of Pesticides Containing Diflubenzuron, Fenbutatin Oxide, And Propargite);

2. The records of EPA's implementation of RPAs, RPMs, and Conservation Recommendations found in the biological opinion "Environmental Protection Agency Registration of Pesticides Oryzalin, Pendimethalin, Trifluralin." Attachment B (EPA's Registration of Pesticides Oryzalin, Pendimethalin, Trifluralin);

3. The records of EPA's implementation of RPAs, RPMs, and Conservation Recommendations found in the biological opinion "Registration of Pesticides 2,4-D, Triclopyr BEE, Diuron, Linuron, Captan, and Chlorothalonil." Attachment C (Registration of Pesticides 2,4-D, Triclopyr BEE, Diuron, Linuron, Captan, and Chlorothalonil); and

4. The records of EPA's implementation of RPAs, RPMs, and Conservation Recommendations found in the biological opinion "Environmental Protection Agency Registration of Pesticides Containing Azinphos methyl, Bensulide, Dimethoate, Disulfoton, Ethoprop, Fenamiphos, Naled, Methamidophos, Methidathion, Methyl parathion, Phorate and Phosmet (13 pesticides)." Attachment D (EPA's Registration of Pesticides Containing Azinphos methyl, Bensulide, Dimethoate, Disulfoton, Ethoprop,

Fenamiphos, Naled, Methamidophos, Methidathion, Methyl parathion, Phorate and Phosmet (13 pesticides)).

For this request, the term "records" refers to, but is not limited to, documents, correspondence (including, but not limited to, inter and/or intra-agency correspondence as well as correspondence with entities or individuals outside the federal government), emails, letters, notes, recordings, telephone records, voicemails, telephone notes, telephone logs, text messages, chat messages, minutes, memoranda, comments, files, presentations, consultations, biological opinions, assessments, evaluations, schedules, papers published and/or unpublished, reports, studies, photographs and other images, data (including raw data, GPS or GIS data, UTM, LiDAR, etc.), maps, and/or all other responsive records, in draft or final form.

This request is not meant to exclude any other records that, although not specially requested, are reasonably related to the subject matter of this request. If you or your office have destroyed or determine to withhold any records that could be reasonably construed to be responsive to this request, I ask that you indicate this fact and the reasons therefore in your response.

Under the FOIA Improvement Act of 2016, agencies are prohibited from denying requests for information under FOIA unless the agency reasonably believes release of the information will harm an interest that is protected by the exemption. FOIA Improvement Act of 2016 (Public Law No. 114-185), codified at 5 U.S.C. § 552(a)(8)(A).

Should you decide to invoke a FOIA exemption, please include sufficient information for us to assess the basis for the exemption, including any interest(s) that would be harmed by release. Please include a detailed ledger which includes:

1. Basic factual material about each withheld record, including the originator, date, length, general subject matter, and location of each item; and

2. Complete explanations and justifications for the withholding, including the specific exemption(s) under which the record (or portion thereof) was withheld and a full explanation of how each exemption applies to the withheld material. Such statements will be helpful in deciding whether to appeal an adverse determination. Your written justification may help to avoid litigation.

If you determine that portions of the records requested are exempt from disclosure, we request that you segregate the exempt portions and mail the non-exempt portions of such records to my attention at the address below within the statutory time limit. 5 U.S.C. § 552(b).

The Center is willing to receive records on a rolling basis.

FOIA's "frequently requested record" provision was enacted as part of the 1996 Electronic Freedom of Information Act Amendments, and requires all federal agencies to give "reading room" treatment to any FOIA-processed records that, "because of the nature of their subject matter, the agency determines have become the subject of subsequent requests for substantially the same records." *Id.* § 552(a)(2)(D)(ii)(I). Also, enacted as part of the 2016 FOIA

Improvement Act, FOIA's Rule of 3 requires all federal agencies to proactively "make available for public inspection in an electronic format" "copies of records, regardless of form or format … that have been released to any person … and … that have been requested 3 or more times." *Id.* § 552(a)(2)(D)(ii)(II). Therefore, we respectfully request that you make available online any records that the agency determines will become the subject of subsequent requests for substantially the same records, and records that have been requested three or more times.

Finally, agencies must preserve all the records requested herein while this FOIA is pending or under appeal. The agency shall not destroy any records while they are the subject of a pending request, appeal, or lawsuit under the FOIA. 40 C.F.R. § 2.106; *see Chambers v. U.S. Dept. of Interior*, 568 F.3d 998, 1004 (D.C. Cir. 2009) ("[A]n agency is not shielded from liability if it intentionally transfers or destroys a document after it has been requested under FOIA or the Privacy Act"). If any of the requested records are destroyed, the agency and responsible officials are subject to attorney fee awards and sanctions, including fines and disciplinary action. A court held an agency in contempt for "contumacious conduct" and ordered the agency to pay plaintiff's costs and fees for destroying "potentially responsive material contained on hard drives and email backup tapes." *Landmark Legal Found. v. EPA*, 272 F. Supp.2d 59, 62 (D.D.C. 2003); *see also Judicial Watch, Inc. v. Dept. of Commerce*, 384 F. Supp. 2d 163, 169 (D.D.C. 2005) (awarding attorneys' fees and costs because, among other factors, agency's "initial search was unlawful and egregiously mishandled and …likely responsive documents were destroyed and removed"), *aff'd in relevant part*, 470 F.3d 363, 375 (D.C. Cir. 2006) (remanding in part to recalculate attorney fees assessed). In another case, in addition to imposing a $10,000 fine and awarding attorneys' fees and costs, the court found that an Assistant United States Attorney prematurely "destroyed records responsive to [the] FOIA request while [the FOIA] litigation was pending" and referred him to the Department of Justice's Office of Professional Responsibility. *Jefferson v. Reno*, 123 F. Supp. 2d 1, 6 (D.D.C. 2000).

FORMAT OF REQUESTED RECORDS

Under FOIA, you are obligated to provide records in a readily accessible electronic format and in the format requested. 5 U.S.C. § 552(a)(3)(B) ("In making any record available to a person under this paragraph, an agency shall provide the record in any form or format requested by the person if the record is readily reproducible by the agency in that form or format."). "Readily accessible" means text-searchable and OCR-formatted. *See id*. Pursuant to this requirement, we hereby request that you produce all records in an electronic format and in their native file formats. Additionally, please provide the records in a load-ready format with a CSV file index or Excel spreadsheet. If you produce files in .PDF format, then please omit any "portfolios" or "embedded files." Portfolios and embedded files within files are not readily accessible. Please do not provide the records in a single, or "batched," .PDF file. We appreciate the inclusion of an index.

If you should seek to withhold or redact any responsive records, we request that you: (1) identify each such record with specificity (including date, author, recipient, and parties copied); (2) explain in full the basis for withholding responsive material; and (3) provide all segregable portions of the records for which you claim a specific exemption. *Id.* § 552(b). Please correlate any redactions with specific exemptions under FOIA.

RECORD DELIVERY

We appreciate your help in expeditiously obtaining a determination on the requested records. As mandated in FOIA, we anticipate a reply within 20 working days. *Id*. § 552(a)(6)(A)(i); 21 C.F.R. § 20.41(b). Failure to comply within the statutory timeframe may result in the Center taking additional steps to ensure timely receipt of the requested materials. Please provide a complete reply as expeditiously as possible. You may email or mail copies of the requested records to:

Ann K. Brown
Center for Biological Diversity
P.O. Box 11374
Portland, OR 97211
foia@biologicaldiversity.org

If you find that this request is unclear, or if the responsive records are voluminous, please email me to discuss the scope of this request.

REQUEST FOR FEE WAIVER

FOIA was designed to provide citizens a broad right to access government records. FOIA's basic purpose is to "open agency action to the light of public scrutiny," with a focus on the public's "right to be informed about what their government is up to." *NARA v. Favish*, 541 U.S. 157, 171 (2004) quoting *U.S. Dep't of Justice v. Reporters Comm. for Freedom of Press*, 489 U.S. 749, 773-74 (1989) (internal quotation and citations omitted). In order to provide public access to this information, FOIA's fee waiver provision requires that "[d]ocuments shall be furnished without any charge or at a [reduced] charge," if the request satisfies the standard. 5 U.S.C. § 552(a)(4)(A)(iii). FOIA's fee waiver requirement is "liberally construed." *Judicial Watch, Inc. v. Rossotti*, 326 F.3d 1309, 1310 (D.C. Cir. 2003); *Forest Guardians v. U.S. Dept. of Interior*, 416 F.3d 1173, 1178 (10th Cir. 2005).

The 1986 fee waiver amendments were designed specifically to provide non-profit organizations such as the Center access to government records without the payment of fees. Indeed, FOIA's fee waiver provision was intended "to prevent government agencies from using high fees to discourage certain types of requesters and requests," which are "consistently associated with requests from journalists, scholars, and *non-profit public interest groups*." *Ettlinger v. FBI*, 596 F. Supp. 867, 872 (D. Mass. 1984) (emphasis added). As one Senator stated, "[a]gencies should not be allowed to use fees as an offensive weapon against requesters seeking access to Government information ... ." 132 Cong. Rec. S. 14298 (statement of Senator Leahy).

I. The Center Qualifies for a Fee Waiver.

Under FOIA, a party is entitled to a fee waiver when "disclosure of the information is in the public interest because it is likely to contribute significantly to public understanding of the operations or activities of the [Federal] government and is not primarily in the commercial

interest of the requester." 5 U.S.C. § 552(a)(4)(A)(iii). EPA's regulations at 40 C.F.R. § 2.107(l)(1)-(3) establish the same standard.

Thus, EPA must consider four factors to determine whether a request is in the public interest: (1) whether the subject of the requested records concerns "the operations or activities of the Federal government," (2) whether the disclosure is "likely to contribute" to an understanding of government operations or activities, (3) whether the disclosure "will contribute to public understanding" of a reasonably broad audience of persons interested in the subject, and (4) whether the disclosure is likely to contribute "significantly" to public understanding of government operations or activities. *Id*. § 2.107(1)(2). As shown below, the Center meets each of these factors.

A. The Subject of This Request Concerns "The Operations and Activities of the Government."

The subject matter of this request concerns the operations and activities of EPA. This request asks for: (1) the records of EPA's implementation of RPAs, RPMs, and Conservation Recommendations found in the biological opinion "Environmental Protection Agency's Registration of Pesticides Containing Diflubenzuron, Fenbutatin Oxide, And Propargite." Attachment A; (2) the records of EPA's implementation of RPAs, RPMs, and Conservation Recommendations found in the biological opinion "Environmental Protection Agency Registration of Pesticides Oryzalin, Pendimethalin, Trifluralin." Attachment B; (3) the records of EPA's implementation of RPAs, RPMs, and Conservation Recommendations found in the biological opinion "Registration of Pesticides 2,4-D, Triclopyr BEE, Diuron, Linuron, Captan, and Chlorothalonil." Attachment C; and (4) the records of EPA's implementation of RPAs, RPMs, and Conservation Recommendations found in the biological opinion "Environmental Protection Agency Registration of Pesticides Containing Azinphos methyl, Bensulide, Dimethoate, Disulfoton, Ethoprop, Fenamiphos, Naled, Methamidophos, Methidathion, Methyl parathion, Phorate and Phosmet (13 pesticides)." Attachment D.

This FOIA will provide the Center and the public with crucial insight into EPA's work with toxic pesticides. It is clear that a federal agency's implementation of the Biological Opinion on EPA's registration of pesticides is a specific and identifiable activity of the government, and in this case, it is the executive branch agency of EPA. *Judicial Watch*, 326 F.3d at 1313 ("[R]easonable specificity is all that FOIA requires with regard to this factor") (internal quotations omitted). Thus, the Center meets this factor.

B. Disclosure is "Likely to Contribute" to an Understanding of Government Operations or Activities.

The requested records are meaningfully informative about government operations or activities and will contribute to an increased understanding of those operations and activities by the public.

Disclosure of the requested records will allow the Center to convey to the public information about the implementation of EPA's Biological Opinion regarding registration of toxic pesticides. The Center will use the records to understand the impacts of pesticides on endangered species

nationwide. Once the information is made available, the Center will analyze it and present it to its 1.4 million members and online activists and the general public in a manner that will meaningfully enhance the public's understanding of this topic.

Thus, the requested records are likely to contribute to an understanding of EPA's operations and activities.

C. Disclosure of the Requested Records Will Contribute to a Reasonably Broad Audience of Interested Persons' Understanding of EPA's Implementation of the Biological Opinion.

The requested records will contribute to public understanding of whether EPA's actions are consistent with EPA's mission to "to protect human health and the environment."[1]

The activities of EPA generally, and specifically its implementation of pesticide Biological Opinons are areas of interest to a reasonably broad segment of the public. The Center will use the information it obtains from the disclosed records to educate the public at large. *See W. Watersheds Proj. v. Brown*, 318 F.Supp.2d 1036, 1040 (D. Idaho 2004) ("... find[ing] that WWP adequately specified the public interest to be served, that is, educating the public about the ecological conditions of the land managed by the BLM and also how … management strategies employed by the BLM may adversely affect the environment.").

Through the Center's synthesis and dissemination (by means discussed in Section II, below), disclosure of information contained in and gleaned from the requested records will contribute to a broad audience of persons who are interested in the subject matter. *Ettlinger v. FBI*, 596 F. Supp. at 876 (benefit to a population group of some size distinct from the requester alone is sufficient); *Carney v. Dept. of Justice*, 19 F.3d 807, 815 (2d Cir. 1994), *cert. denied*, 513 U.S. 823 (1994) (applying "public" to require a sufficient "breadth of benefit" beyond the requester's own interests); *Cmty. Legal Servs. v. Dep't of Hous. & Urban Dev*., 405 F. Supp.2d 553, 557 (E.D. Pa. 2005) (in granting fee waiver to community legal group, court noted that while the requester's "work by its nature is unlikely to reach a very general audience," "there is a segment of the public that is interested in its work").

Indeed, the public does not currently have an ability to easily evaluate the requested records, which are not currently in the public domain. *See Cmty. Legal Servs.*, 405 F. Supp.2d at 560 (because requested records "clarify important facts" about agency policy, "the CLS request would likely shed light on information that is new to the interested public."). As the Ninth Circuit observed in *McClellan Ecological Seepage Situation v. Carlucci*, 835 F.2d 1282, 1286 (9th Cir. 1987), "[FOIA] legislative history suggests that information [has more potential to contribute to public understanding] to the degree that the information is new and supports public oversight of agency operations… ."[2]

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[1] EPA, *About EPA: Our Mission and What We Do*, https://www.epa.gov/aboutepa/our-missionand-what-we-do (last visited Jun. 14, 2019).

[2] In this connection, it is immaterial whether any portion of the Center's request may currently be in the public domain because the Center requests considerably more than any piece of

Disclosure of these records is not only "likely to contribute," but is certain to contribute, to public understanding of the implementation of the Biological Opinion. The public is always well served when it knows how the government conducts its activities, particularly matters touching on legal questions. Hence, there can be no dispute that disclosure of the requested records to the public will educate the public about this topic.

D. Disclosure is Likely to Contribute Significantly to Public Understanding of Government Operations or Activities.

The Center is not requesting these records merely for their intrinsic informational value. Disclosure of the requested records will significantly enhance the public's understanding of the effects that pesticides have on environmental and human health, as compared to the level of public understanding that exists prior to the disclosure. Indeed, public understanding will be significantly increased as a result of disclosure because the requested records will help reveal more about this subject matter.

The records are also certain to shed light on EPA's compliance with its own mission.[3] Such public oversight of agency action is vital to our democratic system and clearly envisioned by the drafters of the FOIA. Thus, the Center meets this factor as well.

II. The Center has a Demonstrated Ability to Disseminate the Requested Information Broadly.

The Center is a non-profit organization that informs, educates, and counsels the public regarding environmental issues, policies, and laws relating to environmental issues. The Center has been substantially involved in the activities of numerous government agencies for over 25 years, and has consistently displayed its ability to disseminate information granted to it through FOIA.

In consistently granting the Center's fee waivers, agencies have recognized: (1) that the information requested by the Center contributes significantly to the public's understanding of the government's operations or activities; (2) that the information enhances the public's understanding to a greater degree than currently exists; (3) that the Center possesses the expertise to explain the requested information to the public; (4) that the Center possesses the ability to disseminate the requested information to the general public; (5) and that the news media recognizes the Center as an established expert in the field of imperiled species, biodiversity, and impacts on protected species. The Center's track record of active participation in oversight of governmental activities and decision making, and its consistent contribution to the public's understanding of those activities as compared to the level of public understanding prior to disclosure are well established.

The Center intends to use the records requested here similarly. The Center's work appears in nearly 5,000 news stories online and in print, radio and TV per month, including regular

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information that may currently be available to other individuals. *See Judicial Watch*, 326 F.3d at 1315.

[3] *See supra* note 1.

reporting in such important outlets as *The New York Times*, *Washington Post*, *The Guardian*, and *Los Angeles Times*. Many media outlets have reported on the adverse impact pesticides have on 3 See supra note 1. 8 the environmental and human health, utilizing information obtained by the Center from federal agencies. In 2018, more than 2.5 million people visited the Center's extensive website and viewed pages a total of 4.3 million times. The Center sends out more than 277 email newsletters and action alerts per year to more than over 1.4 million members and supporters. Three times a year, the Center sends printed newsletters to more than 69,500 members. More than 420,000 people have "liked" the Center on Facebook, and there are regular postings regarding environmental protection. The Center also regularly tweets to more than 71,200 followers on Twitter. The Center intends to use any or all of these far-reaching media outlets to share with the public information obtained as a result of this request.

Public oversight and enhanced understanding of the EPA's duties is absolutely necessary. In determining whether disclosure of requested information will contribute significantly to public understanding, a guiding test is whether the requester will disseminate the information to a reasonably broad audience of persons interested in the subject. *Carney*, 19 F.3d 807. The Center need not show how it intends to distribute the information, because "[n]othing in FOIA, the [agency] regulation, or our case law require[s] such pointless specificity." *Judicial Watch*, 326 F.3d at 1314. It is sufficient for the Center to show how it distributes information to the public generally. *Id.*

III. Obtaining the Requested Records is of No Commercial Interest to the Center.

Access to government records, disclosure forms, and similar materials through FOIA requests is essential to the Center's role of educating the general public. Founded in 1994, the Center is a 501(c)(3) nonprofit conservation organization (EIN: 27-3943866) with more than 1.4 million members and online activists dedicated to the protection of endangered and threatened species and wild places. The Center has no commercial interest and will realize no commercial benefit from the release of the requested records.

IV. Conclusion

For all of the foregoing reasons, the Center qualifies for a full fee waiver. We hope that EPA will immediately grant this fee waiver request and begin to search and disclose the requested records without any unnecessary delays.

If you have any questions, please contact me at foia@biologicaldiversity.org. All records and any related correspondence should be sent to my attention at the address below.

Sincerely,

Ann K. Brown
Open Government Coordinator
CENTER FOR BIOLOGICAL DIVERSITY

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Attachments

Attachment A (EPA's Registration of Pesticides Containing Diflubenzuron, Fenbutatin Oxide, And Propargite)

Attachment B (EPA's Registration of Pesticides Oryzalin, Pendimethalin, Trifluralin)

Attachment C (Registration of Pesticides 2,4-D, Triclopyr BEE, Diuron, Linuron, Captan, and Chlorothalonil)

Attachment D (EPA's Registration of Pesticides Containing Azinphos methyl, Bensulide, Dimethoate, Disulfoton, Ethoprop, Fenamiphos, Naled, Methamidophos, Methidathion, Methyl parathion, Phorate and Phosmet (13 pesticides))

Attachment A

15 REASONABLE AND PRUDENT ALTERNATIVE

When NMFS concludes that an action is likely to jeopardize ESA-listed species or destroy or adversely modify critical habitat, NMFS suggests a reasonable and prudent alternative (RPA) that would allow the action to proceed in compliance with section 7(a)(2) and that can be taken by the action agency and the applicant (ESA Section 7(a)(3)(A)). Joint NMFS and U.S. Fish and Wildlife Service regulations (50 CFR §402.02) implementing section 7 define "jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a ESA-listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR §402.02). As noted above, NMFS relies on statutory language to determine adverse modification.

The NMFS' implementing regulations define reasonable and prudent alternatives as alternative actions, identified during formal consultation, that: (1) can be implemented in a manner consistent with the intended purpose of the action; (2) can be implemented consistent with the scope of the action agency's legal authority and jurisdiction; (3) are economically and technologically feasible; and (4) NMFS believes would avoid the likelihood of jeopardizing the continued existence of ESA-listed species or resulting in the destruction or adverse modification of critical habitat (50 CFR §402.02). The overarching requirement is that an RPA must be capable of avoiding jeopardizing ESA-listed species and adversely modifying critical habitat – all other elements of the definition must be evaluated within this context (*Greenpeace v. NMFS*, 55 F. Supp. 2d 1248, 1268 (W.D. Wa. 1999)). NMFS in the preamble to the final section 7 regulations make clear that the overriding consideration is whether a RPA avoids the likelihood of jeopardy. NMFS notes that the action agency's responsibility "permeates the full range of discretionary authority held by the action agency." Thus, NMFS can specify an RPA that involves the maximum exercise of the action agency's authority when the Services deem necessary to avoid the likelihood of jeopardy (51 FR 19926, 19937 (June 3, 1986)).

The other three factors are intended to implement the statutory phrase "can be taken." The third factor, technological and economic feasibility, refers to the ability of the federal agency to implement the RPA: "[t]he requirement that a RPA be 'economically and technologically feasible' only requires that the Corps have the resources and technology necessary to implement the RPA." *In Re: Operation of the Missouri River System Litigation.* 363 F. Supp. 2d 1145, 1161 (D. Minn. 2004), citing *Kandra v. U.S.*, 145 F.Supp. 2d 1192, 1207 (D. Ore.) ("the RPAs must be economically and technically feasible for *the government* to implement."); see also San Luis & Delta-Mendota Water Authority v. Jewell, 2014 WL 975130 at 38-40 (C.A.9 (Cal.)). This regulatory factor was included in the final section 7 implementing regulations in response to a comment, without further explanation or discussion. The ESA contains no requirement for analysis of economic impacts resulting from implementation of a RPA, and the insertion of the phrase "economically feasible" in regulation cannot create this requirement. Any obligation that NMFS "balance the benefit to the species against the economic and technical burden on the

industry before approving an RPA would be fundamentally inconsistent with the purposes of the ESA and with case law interpreting the Act." *Greenpeace v. NMFS*, 55 F. Supp. 2d 1248, 1267 (W.D. Wash. 1999). While the Services will defer in most cases to the action agency's expertise as to whether a RPA is reasonable, including whether the RPA is technologically and economically feasible, the Services cannot abdicate their duty to formulate and recommend RPAs (51 FR at 19952). However, the action agency may choose or may be obligated to conduct an economic analysis and to evaluate impacts to interests other than the applicants when it implements a RPA pursuant to its authorities.

In this Opinion, NMFS concluded that EPA's proposed registration of pesticides containing diflubenzuron is likely to jeopardize the continued existence of 23 of the 28 ESUs/DPSs of listed salmonids. We also concluded that EPA's registration of diflubenzuron is likely to adversely modify or destroy designated critical habitat for 23 of 26 ESUs/DPSs; and is likely to adversely modify or destroy proposed designated habitat for 2 of 2 ESUs/DPSs. Additionally, EPA's registrations of fenbutatin oxide and propargite are each likely to jeopardize the continued existence of 21 of the 28 endangered and threatened Pacific salmonid ESUs/DPSs. We also concluded EPA's registration of fenbutatin-oxide and propargite are each likely to destroy or adversely modify designated critical habitat for 21 of the 26 threatened and endangered salmonid ESUs/DPSs, and such registration is likely to adversely modify or destroy proposed designated habitat for 2 of 2 ESUs/DPSs.

NMFS reached these conclusions because predicted concentrations of these three a.i.s are likely to have direct and indirect adverse effects to Pacific salmonids including significant reductions in growth and survival by impairing water quality and salmonid prey production in freshwater rearing, spawning, and migratory habitats, particularly in floodplain habitats[28] and small first and second order streams. NMFS also concluded that the predicted concentrations will have adverse effects to the PCEs of designated critical habitat.

As a result, affected ESUs/DPSs of listed Pacific salmonids are likely to suffer reductions in viability from one or more of the a.i.s given the severity of expected changes in abundance and productivity associated with the proposed action. These adverse effects are expected to appreciably reduce the likelihood of both the survival and recovery of these listed Pacific salmonids and reduce the conservation value of some species' designated critical habitat.

The RPA accounts for the following issues: (1) the action will result in exposure to other chemical stressors in addition to the a.i. that may increase the risk of the action to ESA-listed

28 Floodplain habitat – water bodies and/or inundated areas that are connected (accessible to salmonid juveniles) seasonally or annually to the main channel of a stream including but not limited to features such as side channels, alcoves, ox bows, ditches, and tributaries. Main channel –the stream channel that includes the thalweg (longitudinal continuous deepest portion of the channel).

species, including unspecified inert ingredients, adjuvants, and tank mixes; (2) exposure to chemical mixtures containing the a.i.s and other chemical compounds may result in greater toxicity; and (3) exposure to other chemicals and physical stressors (*e.g.*, temperature) in the baseline habitat will likely intensify response to the a.i.s.

The action as implemented under the RPA will remove the likelihood of jeopardy and of destruction or adverse modification of critical habitat by reducing exposure of the stressors of the action . In the proposed RPA, NMFS does not attempt to ensure there is no take of ESA-listed species. NMFS concludes that take will likely occur, and has provided an incidental take statement exempting that take from the take prohibitions as long as the action is conducted in compliance with the terms and conditions of the incidental take statement. Avoiding take altogether would most likely entail canceling registration, or prohibiting use in watersheds inhabited by salmonids. The goal of the RPA is to reduce exposure to listed Pacific salmonids to ensure that the action is not likely to jeopardize ESA-listed species or destroy or adversely modify critical habitat.

For each active ingredient, the elements of the RPA selected apply only to those ESUs/DPSs where NMFS has determined that EPA cannot insure that its registration of that a.i. avoids jeopardy or the destruction or adverse modification of critical habitat (Table 171 and Table 172). These elements rely upon recognized practices for reducing loading of pesticide products into aquatic habitats.

15.1 Elements of the Reasonable and Prudent Alternative

The RPA is comprised of three elements, of which, at least one must be implemented in its entirety when applying end-use products containing the a.i.s. The RPA must be implemented by EPA within one and one-half years of receipt of this Opinion (*i.e.*, June 30 2016), to ensure the registration of the three a.i.'s is not likely to jeopardize endangered or threatened Pacific salmonids under the jurisdiction of NMFS or destroy or adversely modify critical habitat designated for these species.

The elements shall be specified on FIFRA labels of all pesticide products containing diflubenzuron, fenbutatin oxide, and propargite. Alternatively, the label could direct pesticide users to the EPA's Endangered Species Protection Program (ESPP) bulletins that specify the elements. For purposes of this RPA salmonid habitats are defined as freshwaters, estuarine habitats, and nearshore marine habitats including bays within the ESU/DPS ranges including migratory corridors. The freshwater habitats include intermittent streams and other habitats temporally connected to salmonid-bearing waters when those habitats contain water. Freshwater habitats also include all known types of floodplain habitats as well as drainages, ditches, and other man-made conveyances to salmonid habitats that lack salmonid exclusion devices (*e.g.*, screens).

15.2 Context and Rationale

In addition to avoiding jeopardy and adverse modification of critical habitat, the following RPA was developed with three intended goals. First, the RPA is intended to reduce loading of harmful pesticide chemicals into salmon habitat. Reduced loading into aquatic systems reduces the likelihood that salmon and/or their critical habitat will be exposed to the stressors of the action. Furthermore, reducing exposure reduces the potential for adverse effects on salmonid health including growth, reproduction, and survival of individuals and populations, as well as adverse effects to critical habitat including areas used for spawning, rearing, and migration. The RPA seeks to reduce loading to the extent that EPA can ensure that jeopardy and adverse modification of critical habitat are avoided while simultaneously allowing applications of registered pesticides.

Second, the RPA aims to incorporate ongoing landowner stewardship efforts in salmonid habitats given those efforts demonstrate reduced loading of the stressors of the action. There are numerous federal, state, and local programs that assist landowners in promoting responsible land management practices and implementing conservation measures that benefit salmonids and critical habitats. Conservation practices including the creation of riparian areas, planting riparian vegetation, shallow wetlands, and conservation buffers have been used to achieve various degrees of habitat protection, species enhancement, and pollution control. If these practices demonstrate reduced loading of the three active ingredients to the extent that likely jeopardy and adverse modification are avoided, they are acceptable for incorporation into the RPA.

Third, the RPA is intended to protect vulnerable floodplain habitats from the stressors of the action. The RPA is also intended to support current and future restoration and conservation efforts of floodplain habitats, thereby supporting the ultimate recovery of threatened and endangered salmonids. The RPA should be consistent with the emphasis of the ESA to recover protected species, as well as the mission of NMFS to manage, conserve, and protect living resources under our jurisdiction. Restoration of salmonid habitats, especially floodplains and other shallow aquatic areas, are essential for salmonid recovery. The more reductions in loading of pesticides into these habitats, the greater the confidence we have that EPA can insure jeopardy and adverse modification of critical habitat are avoided.

Authorized labels state that end-use products containing each of the three active ingredients are toxic to aquatic invertebrates and/or fish. In the *Environmental Hazard* section of pesticide labels, applicators are mandated to keep pesticide end-use products out of aquatic areas from spray drift and runoff and to avoid contaminating water with wash water and rinsate. Based on risk the end-use products comprise to salmonid habitats described in this Opinion, we concur with the need to keep these materials out of aquatic areas that support salmonids and thus structure the RPAs to attain this goal. Surface water monitoring and/or pesticide fate models show that each of the three active ingredients reach salmonid habitats from authorized used at

levels where EPA cannot insure that jeopardy and adverse modification of critical habitat are avoided. Therefore, additional economically and technologically feasible restrictions are needed.

We considered site-specific, no-spray buffers as an element of the RPA, however we encountered several aspects that make this approach technologically unfeasible. Ideally, we would be able to apply a no-spray buffer based on site-specific information for each application of the pesticides. Realistically, however, site-specific no-spray buffers require extensive analysis and verification. There may be some aspects of a site that may inform the size of a no-spray buffer such as presence of a functioning riparian area that intercepts both spray drift and runoff. For sites that do not have such an area, further analysis and verification would be needed. Such an analysis might include the following. Prior to application of the stressors of the action site-specific knowledge of aquatic areas potentially contaminated combined with current weather and climactic characteristics are necessary to determine the extent of a no-spray buffer. Aquatic area information would include habitat type, hydrologic parameters (flow rate, depth, volume, width, connectivity, etc.). Monitoring of spray drift before, during, and after application would be necessary to ensure pesticides do not reach the aquatic habitats. Current best available pesticide monitoring practices would include use of spray cards adjacent to aquatic areas paired with surface water sampling verified by laboratory chemical analysis. Pesticide runoff would also need to be monitored following the first and second storm events to ensure off-site transport of pesticides is limited. These measures are resource intensive and would likely require expertise in planning, design, execution, analysis, and interpretation all of which incur economic resources and which may not be able to be implemented quickly enough to avoid likely jeopardy or adverse modification. EPA would be responsible for ensuring these practices are followed. Overall we found this element to be unfeasible, since it would place an unreasonable technological and/or economic burden on EPA as well as the applicants and end-users.

The three elements below seek to provide flexibility to EPA, applicants, and pesticide end users for use of diflubenzuron, fenbutatin oxide, and propargite.

15.3 Element 1

The tables below represent no-spray buffers required for each of the three active ingredients comprising end-use products (Table 173, Table 174, and Table 175).

Table 173. Required no-spray buffers for aerial and ground applications of end-use products containing diflubenzuron

Aerial applications		Ground applications	
No-spray buffer size (ft)	**Application rate (lbs diflubenzuron/ acre)**	**No-spray buffer size (ft)**	**Application rate (lbs diflubenzuron/ acre)**
1000	Greater than or equal to 0.125	500	Greater than or equal to 0.3125
500	Less than 0.125	300	Less than 0.3125 and greater than or equal to 0.125
150	Aerial forest applications only (≤0.25): For cases where leaf area index (LAI) exceeds 3.0[1], the current labeled no-spray buffer of 150 ft is sufficient	150	Less than 0.125 and greater than or equal to 0.03125
		75	Less than 0.03125

[1] *Or an alternative measure that can be correlated with LAI*

Table 174. Required no-spray buffers for ground applications of end-use products containing fenbutatin oxide

Aerial applications	Ground applications	
Not applicable, registrant has voluntarily removed this application method from labels.	No-spray buffer size (ft)	Application rate (lbs fenbutatin oxide/ acre)
	500	All authorized rates

Table 175. Required no-spray buffers for aerial and ground applications of end-use products containing propargite

Aerial applications		Ground applications using airblast technologies	
No-spray buffer size (ft)	Application rate (lbs propargite/ acre)	No-spray buffer size (ft)	Application rate (lbs propargite/ acre)
500	Greater than or equal to 2.5	75	Greater than or equal to 2.5
300	Less than 2.5 and greater than or equal to 1.5	50	Less than 2.5
250	Less than 1.5		

15.4 Rationale for no-spray buffers:

No-spray buffers are recognized tools to reduce pesticide loading into aquatic habitats (NRCS 2000). NMFS derived no-spray buffers considering all of the qualitative and quantitative information discussed in the Effects of the Proposed Action, including exposure and response data, and the described limitations of their uses and associated uncertainties. EPA's AgDrift model and AgDisp model were used to estimate concentrations that would result in habitats of different volumes, at different application rates, and using different application methods. Input parameters (e.g., maximum labeled application rates, droplet size, application type) for model estimates were consistent with those specified in our exposure analysis. We varied the size of the no-spray buffer to determine reductions in pesticide loading. These values were compared to both individual and population level toxicological endpoints for the three a.i.s presented earlier in this Opinion. Figure 85, Figure 86, and Figure 87 show comparative examples of effects endpoints with exposure estimates for the no-spray buffers in element one. For each no-spray buffer, the range of concentrations predicted based on a range of application rates (based on a.i.) and receiving volumes (2 m wide by 0.1 m to 1 m deep) is shown.

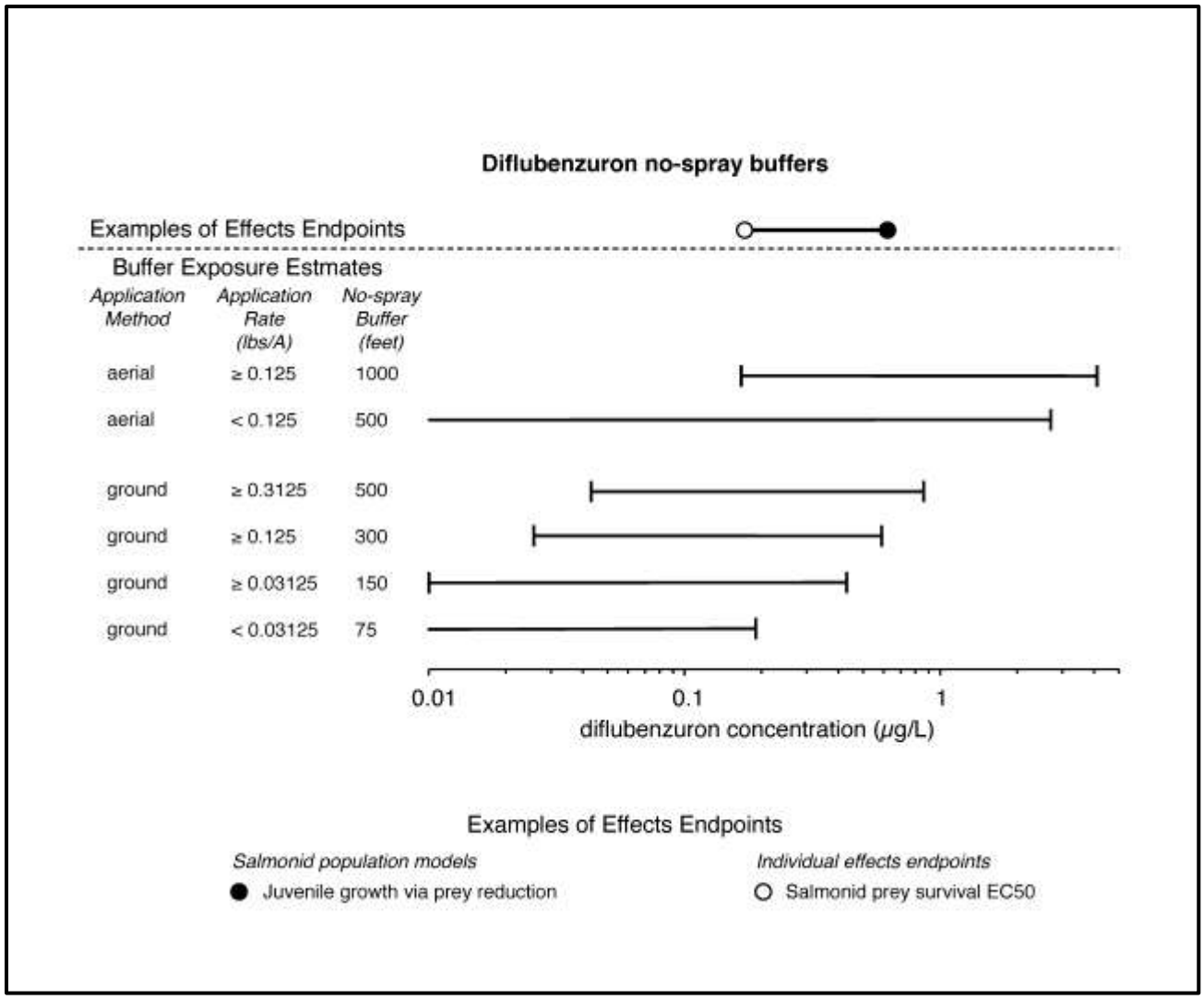

Figure 85. Comparison of diflubenzuron response endpoints and exposure examples for no-spray buffers.

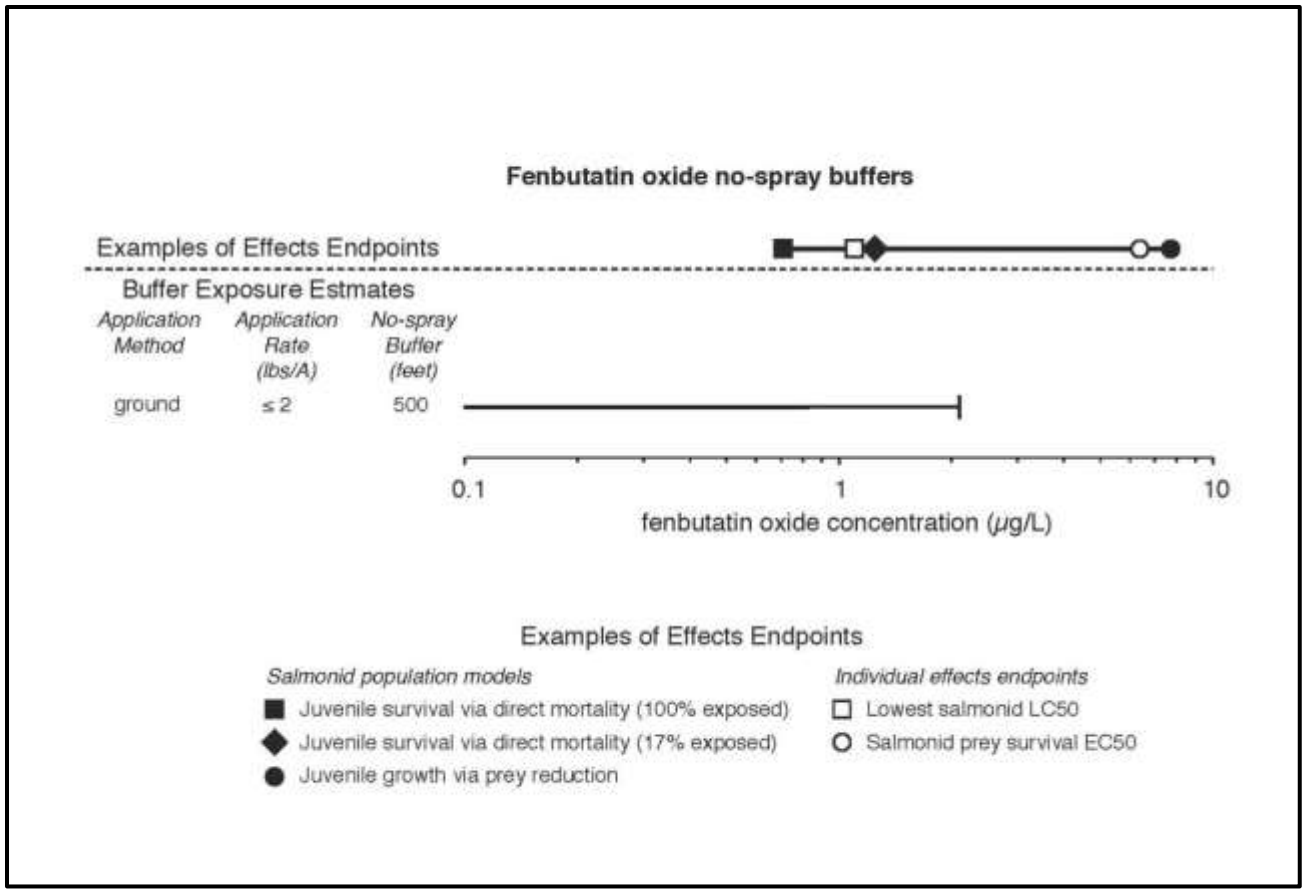

Figure 86. Comparison of fenbutatin oxide response endpoints and exposure examples for no-spray buffers.

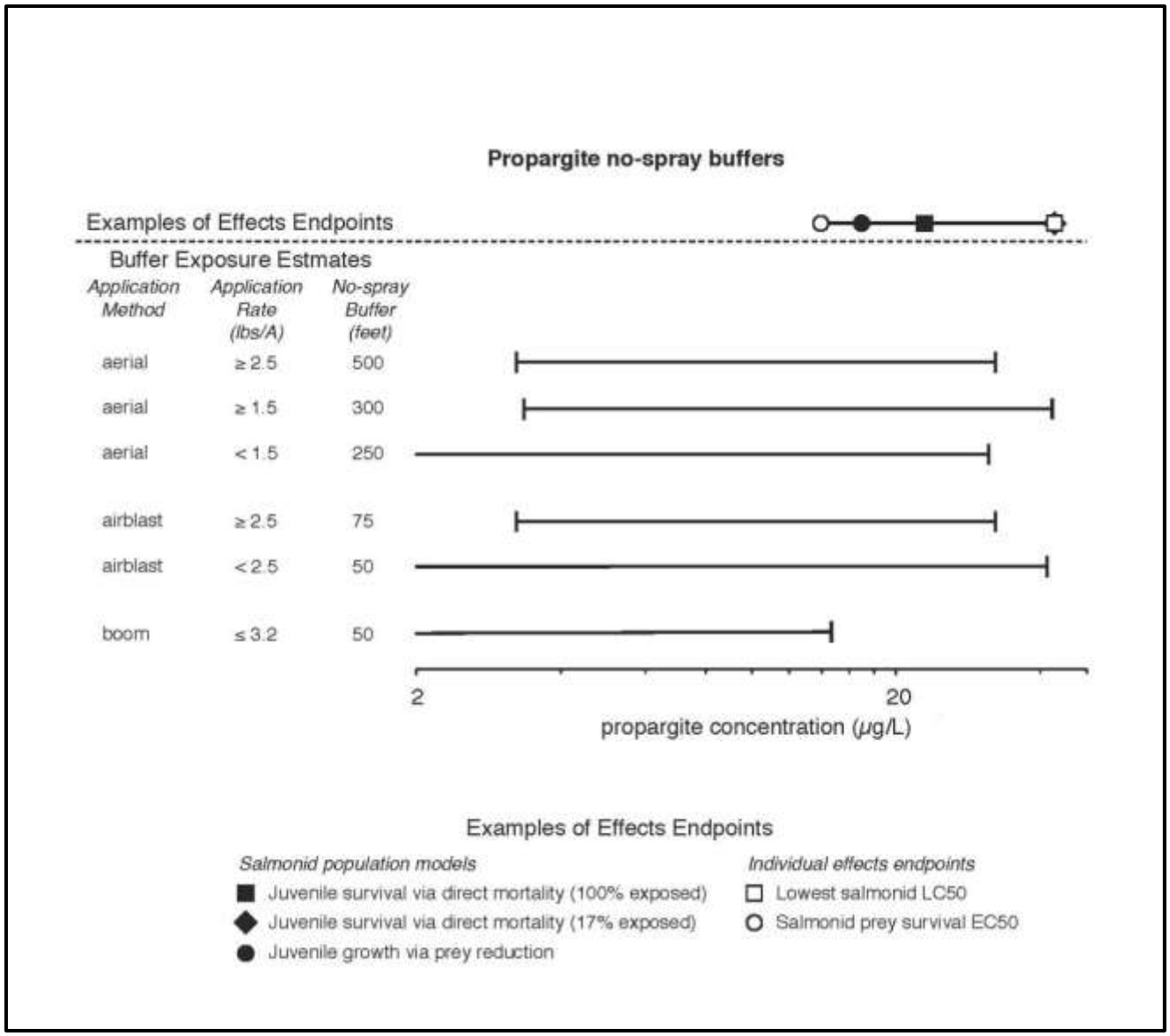

Figure 87. Comparison of propargite response endpoints and exposure examples for no-spray buffers.

The assignment of no-spray buffers in element 1 weighed the available quantitative and qualitative information depicted as lines-of-evidence. For example, we modeled concentrations in aquatic habitats that ranged in depth from 10 cm to 1 meter to estimate how volume of water in the receiving habitat would affect potential exposure in small streams and floodplain habitats that are important rearing areas for salmonids. We recognize that salmonids use a range of habitats, both larger and smaller than the modeled habitats, which would be predicted to have correspondingly lower or higher concentrations than proved by these estimates. AgDrift values represent predictions for initial average concentrations following a drift event; and we considered that the pesticide concentrations will decline over time due to partitioning, degradation, and

dissipation associated with habitat flow or recharge rates. We also considered that the estimates only account for the pesticide active ingredient. They do not account for other stressors that may contribute to increased adverse responses such as other ingredients in the pesticides, adjuvants, and chemical and physical stressors that are present in the baseline habitat.

The degree to which expected exposure to the a.i. overlaps with response endpoints varies somewhat at different buffer sizes and among the three a.i.s. This is due, in part, to qualitative considerations made in assigning the buffers and recognition of inherent uncertainty associated with these estimates. For example, AgDrift estimates associated with aerial application of diflubenzuron at buffers of 500-1000 ft exceed concentrations predicted to cause population level responses associated with reductions in prey. However, we considered that AgDrift has a tendency to over-predict drift at larger buffer distances (Bird et al. 2002). Therefore we expect the predicted concentrations at these buffer distances to occur infrequently. Conversely, greater buffers may be needed than predicted by AgDrift when applications occur closer to salmonid habitat as greater concentrations are (a) more likely to be realized considering drift observed in field trials, and (b) the runoff pathway is more likely to be a contributing pathway of exposure. A greater margin of safety (less overlap of predicted exposure with response endpoints) was warranted for fenbutatin oxide compared to the other a.i.s given differences in environmental fate and effects. AgDrift does not account for potential increases in exposure due to multiple applications of pesticides. Fenbutatin oxide, an organotin, is highly persistent and more readily accumulates in the environment compared to the other two a.i.s. Fenbutatin oxide is also highly toxic to juvenile salmonids and impacts to salmonid survival have direct implications for population level effects. It is important to note the toxicity values presented in the figures above do not address all of the likely effects. For example, the LC50 for propargite represents the median survival response of individual salmonids. We recognize that sensitive individuals will be impacted at lower concentrations reflective of where they are on the dose-response curve. We also note that the examples of effects endpoints presented in the figures are not the sole evidence used to evaluate risk. Other risk hypotheses were evaluated in the analysis that demonstrates additional risk to ESA-listed species (see Figure 82, Figure 83, and Figure 84).

Pesticide droplet size is an important variable that influences how far spray-applied pesticides can drift off site (Bird et al. 2002). We considered label specifications and changes proposed by applicants that restrict droplet size. In some cases it may be possible to reduce the size of no-spray buffers by requiring larger droplet size distributions. However, we are not recommending that approach at this stage of the consultation because further discussions are necessary with EPA and applicants to determine if resulting changes would remain efficacious.

15.5 Element 2

The following no-spray buffers apply to application sites with a maintained ≥30 ft vegetated filter strip of grass or other permanent vegetation designed to remove pesticides and other contaminants in runoff (NRCS 2000).

Table 176 Required no-spray buffers for aerial and ground applications of end-use products containing diflubenzuron [30 ft maintained vegetated filter strip required]

Aerial applications	
No-spray buffer size (ft)	Application rate (lbs diflubenzuron/ acre)
750	Greater than or equal to 0.125
375	Less than 0.125

Ground applications	
No-spray buffer size (ft)	Application rate (lbs diflubenzuron/ acre)
375	Greater than or equal to 0.3125
225	Less than 0.3125 and greater than or equal to 0.125
110	Less than 0.125 and greater than or equal to 0.03125
60	Less than 0.03125

Table 177 Required no-spray buffers for ground applications of end-use products containing fenbutatin oxide [30 ft maintained vegetated filter strip required]

No authorized aerial applications

Ground applications	
No-spray buffer size (ft)	Application rate (lbs fenbutatin oxide/ acre)
375	All authorized rates

Table 178 Required no-spray buffers for aerial and ground applications of end-use products containing propargite [30 ft maintained vegetated filter strip required]

Aerial applications	
No-spray buffer size (ft)	Application rate (lbs propargite/ acre)
375	Greater than or equal to 2.5
225	Less than 2.5 and greater than or equal to 1.5
175	Less than 1.5

Ground applications using airblast technologies	
No-spray buffer size (ft)	Application rate (lbs propargite/ acre)
60	Greater than or equal to 2.5
50	Less than 2.5

15.6 Element 3

Riparian areas occur alongside watercourses or water bodies and are distinct from surrounding lands due to their unique soil and vegetation characteristics that are influenced by the hydrologic conditions of the soil. Pesticides are known to move from treated agricultural and forested areas via spray drift and surface water runoff into the broader environment, and riparian areas may act to filter runoff and intercept drift thereby reducing loading into off target water bodies. The effective width of a riparian area for reducing pesticide loading is influenced by many factors including the toxicity of the pesticide active ingredient, habitat characteristics including water depth and flow, weather conditions at the time of application, canopy height and composition, and the type of application system (e.g., aerial vs. ground) (NRCS 2000) . Although these variables are complex and difficult to control, a robust body of research shows that riparian buffers are protective of sensitive aquatic habitats. Reductions in pesticide drift from 75 to 95% up to 30 m (~98.4 feet) downwind occurred with a no-spray buffer comprised of grass, shrubs, or trees was used (Wolfe et al. 2003). A riparian area of up to 91.5 m (~300 ft) wide protected an adjacent stream and pond from aerial applications of chlorothalonil and endosulfan on a Christmas tree plantation (Felsot et al. 2003). Generally, the use of riparian areas, coupled with low-drift application methods, reduce drift deposition and runoff into sensitive aquatic habitats adjacent to pesticide use sites.

Riparian areas function as buffers that filter, transform, and adsorb pesticides and other chemicals. Riparian vegetation slows sediment-laden runoff, and depending on the width and complexity of the area, may deposit or absorb 50 to 100% of sediments as well as the pesticides attached to them (Hawes and Smith 2005). Riparian vegetation may act as a sink by absorbing and degrading pesticides that would otherwise flow into adjacent aquatic habitats. Additionally, certain microbes in the soil associated with the roots of riparian vegetation can degrade pesticides. Another important function of riparian buffers is enhanced infiltration of surface runoff (Dillaha et al. 1989). Riparian vegetation in the buffer zone surrounding a waterbody increases surface roughness and slows overland flows. These slower flows help regulate the volume of water entering rivers and streams, thereby minimizing flood events, scouring of the streambed, and pesticide loading. In addition to reducing pesticide loads, riparian buffers provide many benefits to salmonids and their habitats by increasing shade, reducing water temperatures, increasing inputs of woody debris, increasing inputs of terrestrial insect food items, and reducing flashy water flows.

Riparian areas may substantially reduce pesticide loading, negating the need for no-spray buffers.

The effectiveness in reducing pesticide loading depends on site-specific factors such as dimensions, type, and complexity of the riparian vegetation. By coordinating and collaborating with EPA, USDA NRCS, and others to explore use of riparian areas to reduce loading of pesticides into salmonid habitats, a novel system could be developed to incorporate riparian areas

as a tool to reduce pesticide loading. Potentially, riparian areas could be classified and verified by qualified personnel following NRCS protocols to ensure they effectively reduce pesticide loading. If such a system could be designed, landowners with functioning riparian areas would be required to follow a reduced set of no-spray buffers or not have to follow the no-spray buffer requirements outlined in elements 1 and 2.

NMFS has determined that the RPA will enable EPA to proceed with its action in compliance with section 7 of the ESA. NMFS has also determined that the RPA complies with the other regulatory requirements in the Services' implementing regulations.

Consistent with the Intended Purpose of the Action. NMFS has concluded that this RPA is consistent with EPA's purpose of authorizing use of products containing these three a.i.s. EPA can only authorize pesticide use when it does not have an unreasonable adverse effect on the environment. The RPA allows continued authorization of use of these products, but allows it to proceed in a manner consistent with the ESA and FIFRA.

Consistent with the Scope of EPA's Authority. NMFS has concluded that EPA has the authority to authorize the use of ingredients containing these three a.i.s with the limitations recommended in this RPA. EPA has authority to restrict use when such use will cause an unreasonable adverse effect to the environment.

Technological Feasibility. No application and no spray buffers around water bodies are a recognized method of protecting aquatic species from exposure to pesticides. EPA labels contain buffer requirements for other pesticide products.

Economic Feasibility. NMFS has determined that the RPA is economically feasible. As noted above, the requirement is that an RPA is economically feasible to implement, not that its implementation be cost-free. As noted above for technological feasibility, buffers are a commonly used tool to prevent pesticide product from entering waters and riparian zones, and EPA has incorporated buffer requirements in FIFRA labels.

Because this Opinion has found jeopardy and destruction or adverse modification to designated critical habitat, the EPA is required to notify NMFS of its final decision on the implementation of the reasonable and prudent alternatives (50 CFR §402.15(b)).

16 INCIDENTAL TAKE STATEMENT

Section 9(a)(1) of the ESA prohibits the taking of endangered species without a specific permit or exemption. Protective regulations adopted pursuant to section 4(d) of the ESA extend the prohibition to threatened species. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct (50 CFR 222.102). Harm is further defined by NMFS to include significant habitat modification or degradation that results in death or injury to ESA-listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action, whether implemented as proposed or as modified by reasonable and prudent alternatives, is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

16.1 Amount or Extent of Take Anticipated

As described earlier in this Opinion, this is a consultation on the EPA's registration of pesticide products containing diflubenzuron, fenbutatin-oxide, or propargite, and their formulations as they are used in the Pacific Northwest and California and the impacts of these applications on listed ESUs/DPSs of Pacific salmonids. The EPA authorizes use of these pesticide products for pest control purposes across multiple landscapes. The goal of this Opinion is to evaluate the impacts to NMFS' listed resources from the EPA's broad authorization of applied pesticide products. This Opinion is a partial consultation because pursuant to the court's order, EPA sought consultation on only 26 listed Pacific salmonids under NMFS' jurisdiction. However, even though the court's order did not address the two more recently listed ESUs and DPSs, NMFS analyzed the impacts of EPA's actions to them because they belong to the same taxon and the analysis requires consideration of the same information. Consultation with NMFS will be completed when EPA makes effect determinations on all remaining ESA-listed species under NMFS' jurisdiction and consults with NMFS as necessary.

For this Opinion, NMFS anticipates the general direct and indirect effects that would occur from EPA's registration of pesticide products across the states of California, Idaho, Oregon, and Washington to 28 listed Pacific salmonids under NMFS' jurisdiction during the 15-year duration of the proposed action. Recent and historical surveys indicate that listed salmonids occur in the action area, in places where they will be exposed to the stressors of the action. The RPAs are designed to reduce this exposure but not eliminate it. Pesticide runoff and drift of diflubenzuron, fenbutatin-oxide, and propargite are most likely to reach streams and other aquatic sites when they are applied to crops and other land use settings located adjacent to wetlands, riparian areas, ditches, off-channel habitats, and intermittent streams. These inputs into aquatic habitats are especially high when rainfall immediately follows applications, or if wind conditions exacerbate inputs from drift. The effects of pesticides and other contaminants found in urban runoff,

especially from areas with a high degree of impervious surfaces, may also exacerbate degraded water quality conditions of receiving waters used by salmon. Urban runoff is also generally warmer in temperature, and elevated water temperature poses negative effects on certain life history phases for salmon. The range of effects of the 3 a.i.s on salmonids includes killing fish directly, reductions in prey leading to starvation or impairing salmonid growth. Impaired growth lends juveniles prone to becoming prey to other fish or avian predators. Impairing feeding ability may also make fish more susceptibility to disease. Thus, we expect some exposed fish will respond to these effects by changing normal behaviors. These results are not the purpose of the proposed action. Therefore, incidental take of listed salmonids is reasonably certain to occur over the 15-year duration of the proposed action.

Given the variability of real-life conditions, the broad nature and scope of the proposed action, and the migratory nature of salmon, the best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take associated with the proposed action. As explained in the *Description of the Proposed Action* and the *Effects of the Proposed Action* sections, NMFS identified multiple uncertainties associated with the proposed action. Areas of uncertainty include:

1. Incomplete information on the proposed action (*i.e.*, no master label summarizing all authorized uses of pesticide products diflubenzuron, fenbutatin-oxide, and propargite);
2. Limited use and exposure data on stressors of the action for non-agricultural uses of these pesticides;
3. Minimal information on exposure and toxicity for pesticide formulations, adjuvants, and other/inert ingredients within registered formulations;
4. Minimal information on permitted tank mixtures and associated exposure estimates;
5. Limited data on toxicity of environmental mixtures;
6. No known method to predict synergistic responses from exposure to combinations of these 3 a.i.s with other mixtures or other chemicals in the baseline;
7. Variability in annual land use, crop cover, and pest pressure;
8. Temporal and spatial variability within each ESU, especially at the
9. population-level; and
10. Size and flow variations of water bodies in which salmonids live.

NMFS therefore identifies, as a surrogate for the allowable extent of take, the ability of this action to proceed without any fish kills within the action area attributed to the legal use of diflubenzuron, fenbutatin-oxide, or propargite, or any compounds, degradates, or mixtures in aquatic habitats containing individuals from any ESU/DPS. Because of the difficulty of detecting salmonid deaths, the fishes killed do not have to be listed salmonids. In general, salmonids are relatively sensitive to pesticides compared to other species of fish, so that if there are kills of other freshwater fishes attributed to use of these pesticides, it is likely that salmonids have also died, even if no dead salmonids can be located. In addition, if stream conditions due to pesticide

use kill less sensitive fishes in certain areas, the potential for lethal and non-lethal takes in downstream areas increases. A fish kill is considered attributable to one of these three ingredients, its metabolites, or degradates, if any of the a.i.s is known to have been applied in the vicinity and may reasonably be supposed to have run off or drifted into the affected area, or if surface water samples or pathology indicate lethal levels of the a.i.(s).

NMFS notes that increased monitoring and study of the impact of these pesticides on water quality, particularly water quality in off-channel habitats will inform subsequent consultations and future incidental take statements. Such monitoring and studies will also potentially allow other measures of the extent of take.

16.2 Reasonable and Prudent Measures

The measures described below are non-discretionary measures to avoid or minimize take that must be undertaken by the EPA so that they become binding conditions of any grant or permit issued to the applicant(s), as appropriate, for the exemption in section 7(o)(2) to apply. The EPA has a continuing duty to regulate the activity covered by this incidental take statement. If the EPA (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant(s) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the EPA must report the progress of the action and its impact on the species to NMFS Office of Protected Resources, ESA Interagency Cooperation Division as specified in the incidental take statement [50 CFR§402.14(i)(3)].

To satisfy its obligations pursuant to section 7(a)(2) of the ESA, the EPA must monitor (a) the direct, indirect, and cumulative impacts of its long-term registration of pesticide products containing diflubenzuron, fenbutatin-oxide, or propargite; (b) evaluate the direct, indirect, or cumulative impacts of pesticide misapplications in the aquatic habitats in which they occur; and (c) the consequences of those effects on listed Pacific salmonids under NMFS' jurisdiction. The purpose of the monitoring program is for the EPA to use the results of the monitoring data and modify the registration process in order to reduce exposure and minimize the effect of exposure where pesticides will occur in salmonid habitat. NMFS concludes that all measures described as part of the proposed action, together with use of the Reasonable and Prudent Measures and Terms and Conditions described below, are necessary and appropriate to minimize the likelihood of incidental take of ESA-listed species due to implementation of the proposed action.

The EPA shall:

1. Minimize the amount and extent of incidental take from use of pesticide products containing diflubenzuron, fenbutatin oxide, and propargite by reducing the potential of chemicals to reach salmon-bearing waters;
2. Monitor any incidental take or surrogate measure of take that occurs from the action; and

3. Report annually to NMFS Office of Protected Resources on the monitoring results from the previous year.

16.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, within one and one-half years following the date of issuance of this Opinion, the EPA must comply with the following terms and conditions. These terms and conditions implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. a. Do not authorize application of pesticide products when wind speeds are greater than or equal to 10 mph.

   o. Do not authorize application of pesticide products when soil moisture is at field capacity, or when a storm event likely to produce runoff from the treated area is forecasted (by NOAA/National Weather Service, or other similar forecasting service) to occur within 48 hours following application.

   p. Report all incidents of fish mortality that occur within the vicinity of the treatment area, including areas downstream and downwind, in the four days following application of and of these a.i.s to EPA's Office of Pesticide Programs. Alternatively, these incidents may be reported to the pesticide manufacturer through the phone number on the product label once EPA modifies FIFRA 6(a)2 to require registrants to report all fish kills immediately, regardless of incident classification (i.e. both minor and major incidents). Within one year of receipt of this Opinion, EPA shall submit an annual report to NMFS Office of Protected Resources that identifies the total number of fish affected and incident locations.

   q. EPA shall, in close coordination with NMFS Office of Protected Resources, develop and implement an effectiveness monitoring plan for floodplain habitats, and produce annual reports of the results. The plan shall identify representative floodplain habitats prone to drift and runoff of pesticides within agricultural areas. The representative floodplain habitat sampling sites shall include floodplain habitats currently used by threatened and endangered Pacific salmonids, as identified in coordination with NMFS Office of Protected Resources. Sampling sites include at least two sites for each general species (i.e., coho salmon, chum salmon, steelhead, sockeye salmon, and ocean-type Chinook and stream-type Chinook salmon). Sampling shall consist of daily collection of surface water samples for seven consecutive days during three periods of high application for these a.i.s. Collected water samples will be analyzed for the three active ingredients. A report summarizing annual monitoring data and including all raw data shall be submitted to NMFS Office of Protected Resources and will summarize annual monitoring data and provide all raw data.

2. a. EPA shall include the following instructions requiring reporting of fish kills either on the labels for all products containing diflubenzuron, fenbutatin oxide, or propargite in ESPP Bulletins:

   NOTICE: Incidents where salmon appear injured or killed as a result of pesticide applications shall be reported to NMFS Office of Protected Resources at 301-713-1401 and EPA's Office of Pesticide Programs. The finder should leave the fish alone, make note of any circumstances likely causing the death or injury, location and number of fish involved, and take photographs, if possible. Adult fish should generally not be disturbed

unless circumstances arise where an adult fish is obviously injured or killed by pesticide exposure, or some unnatural cause. NMFS Office of Protected Resources or Office of Law Enforcement may request the finder to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.

b. EPA shall report to NMFS Office of Protected Resources any incidences regarding diflubenzuron, fenbutatin oxide, or propargite effects on aquatic ecosystems added to its incident database that it has classified as probable or highly probable.

3. EPA shall provide OPR a commencement date for annual reporting of monitoring results.

16.3.1 Conservation Recommendations

Section 7(a) (1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on ESA-listed species or critical habitat, to help implement recovery plans, or to develop information.

The following conservation recommendations would provide information for future consultations involving future authorizations of pesticide a.i.s that may affect ESA-listed species:

1. Conduct mixture toxicity analysis in screening-level and endangered species biological evaluations;
2. Develop models to estimate pesticide concentrations in flood plain habitats; and
3. Develop models to estimate pesticide concentrations in aquatic habitats associated with non-agricultural applications, particularly in residential and industrial environments.
4. Work with other appropriate federal agencies to determine efficacy of riparian area management methods in reducing pesticide loading from authorized uses especially the types of vegetation and width of riparian areas needed.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefiting ESA-listed species or their habitats, the EPA should notify NMFS Office of Protected Resources of any conservation recommendations it implements in the final action.

16.4 Reinitiation Notice

This concludes formal consultation on the EPA's proposed registration of pesticide products containing diflubenzuron, fenbutatin oxide, and propargite and their formulations to ESA-listed Pacific salmonids under the jurisdiction of the NMFS. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the extent of take specified in the *Incidental Take Statement* is exceeded; (2) new information reveals effects of this action that may affect ESA-listed species or designated critical habitat in a manner or to an extent not previously considered in this biological opinion; (3) the identified action is subsequently modified in a manner that causes an effect to the ESA-listed species or critical habitat that was not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. NMFS' analysis and conclusions are

based on EPA's action including all label changes proposed by the applicants, as identified in Appendix 1, and incorporated in our consideration of the *Proposed Action*. If all changes agreed to by the manufacturers for one or more of the a.i.s are not fully implemented within 12 months from the date of issuance of this biological opinion, then the action has been modified in a manner that causes effects to ESA-listed species or critical habitat that was not considered in this Opinion, and EPA must contact NMFS to discuss reinitiation. If reinitiation of consultation appears warranted due to one or more of the above circumstances, EPA must contact NMFS Office of Protected Resources, ESA Interagency Cooperation Division. In the event reinitiation conditions (1), (2), or (3) is met, reinitiation will be only for the a.i.(s) which meet that condition, not for all 3 a.i.s considered in the Opinion. If none of these reinitiation triggers are met within the next 15 years, then reinitiation will be required because the Opinion only covers the effects of EPA's action continuing for 15 years. It is recommended that EPA request reinitiation with sufficient time prior to reaching 15 years to allow sufficient time to consult and to prevent lapse of coverage for the active ingredients in this Opinion.

Attachment B

Reasonable and Prudent Alternatives

Regulations (50 CFR §402.02) implementing section 7 of the ESA define reasonable and prudent alternatives as alternative actions, identified during formal consultation, that: (1) can be implemented in a manner consistent with the intended purpose of the action; (2) can be implemented consistent with the scope of the action agency's legal authority and jurisdiction; (3) are economically and technologically feasible; and (4) NMFS believes will alleviate the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat.

This Opinion has concluded EPA's registration of oryzalin is likely to jeopardize the continued existence of 10 of the 28 ESUs/DPSs of listed Pacific salmonids. This Opinion has also concluded EPA's registration of oryzalin is likely to adversely modify or destroy designated critical habitat for 10 of the 26 ESUs/DPSs for which critical habitat has been designated. This Opinion has concluded EPA's registrations of pendimethalin and trifluralin are likely to jeopardize the continued existence of 16 of the 28 ESUs/DPSs of listed Pacific salmonids. This Opinion has also concluded EPA's registrations of pendimethalin and trifluralin are likely to adversely modify or destroy designated critical habitat for 14 of the 26 ESUs/DPSs for which critical habitat has been designated. Critical habitat has not been designated for Lower Columbia River coho and Puget Sound steelhead. NMFS reached these conclusions because predicted concentrations of these a.i.s in salmonid habitats are likely to adversely affect Pacific salmonids, water quality, salmonid prey, natural cover, and/or substrate in freshwater rearing, spawning, and migratory habitats.

NMFS' Reasonable and Prudent Alternative (RPA) accounts for the following issues:

(1) The action will result in exposure to other chemical stressors in addition to the a.i., including unspecified inert ingredients, adjuvants, and tank mixes; which may increase the risk of the action to listed species,
(2) The action will likely result in exposure to chemical mixtures containing multiple a.i.s, which may have additive or synergistic effects; and,
(3) Exposure to other chemicals and physical stressors present in the habitat, but derived from other actions which may intensify response to the a.i.s.

The action as implemented under the NMFS recommended RPA will alleviate the likelihood of jeopardy and adverse modification by reducing the concentrations of each of these a.i.s and associated stressors of the action within the designated critical habitat. In the RPA, NMFS does not attempt to ensure there is no take of listed species. NMFS believes take will occur, and has provided an incidental take statement exempting that take from the take prohibitions. Avoiding take altogether would most likely entail canceling registration, or prohibiting use in watersheds inhabited by salmonids. The goal of the RPA is to reduce exposure, thus ensuring the action is not likely to jeopardize listed species, or destroy or adversely modify critical habitat.

The RPA is comprised of two required elements which must be implemented in its entirety within one year of the EPA's receipt of this Opinion to ensure the registration of these pesticides is not likely to jeopardize listed Pacific salmonids or destroy or adversely modify critical habitat designated for these species. For each a.i., the elements of the RPA apply only to those ESUs/DPSs where NMFS has determined that registration of that a.i. is likely to jeopardize listed species and/or destroy or adversely modify designated critical habitat (Table 115 and Table 116). These sub-elements rely upon recognized practices for reducing the loading of pesticide products into aquatic habitats. Specific elements 1a,b, and c address pesticide loading via spray drift, runoff in the dissolved phase, and entrainment on soil particles. In addition, NMFS has tailored the recommended sub-Elements to each a.i. The recommendation in Element 1a does not apply to oryzalin. The recommendation in Element 1b does not apply to trifluralin. Table 117details which sub elements apply to which ESUs/DPSs.

Because this Opinion has found jeopardy and destruction or adverse modification to designated critical habitat, the EPA is required to notify NMFS of its final decision on the implementation of the reasonable and prudent alternatives (50 CFR §402.15(b)).

Specific Elements of the Reasonable and Prudent Alternative

Elements 1, including any implemented sub-elements or other measures to implement Element 1, and 2 shall be either specified directly on FIFRA labels of all pesticide products containing oryzalin, pendimethalin, or trifluralin or those labels shall direct pesticide users to the EPA's Endangered

Species Protection Program (ESPP) county bulletins which list Elements 1, including any implemented sub-elements or other measures to implement Element 1, and 2. These elements apply when pesticide products containing oryzalin, pendimethalin, or trifluralin are used within an ESU/DPS for which jeopardy or adverse modification of designated critical habitat has been determined. Table 117 shows ESUs/DPSs to which reasonable and prudent alternatives apply.

Salmon-bearing waters are defined as fresh, brackish, and marine waters accessible to salmonids. These waters are defined in the *Federal Register* notice published when the species are listed or their listing status is modified. A list of these waters has been provided to EPA in *Appendix 7*, along with the counties in which they occur. Distances for various restrictions are measured from the ordinary high-water line or bankfull elevation for free-flowing streams and from extreme high water line high water for tidal waters (50 CFR §226.212). "Bankfull elevation is the level at which water begins to leave the channel and move into the floodplain and is reached at a discharge which generally has a recurrence interval of 1 to 2 years on the annual flood series." (50 CFR §226.212).

Element 1. Based on PRZM-EXAMs EECs, concentrations of a.i. in salmon-bearing waters shall at no time exceed the following thresholds:

- Oryzalin 10 μg/L
- Pendimathlin 1 μg/L
- Trifluralin 1 μg/L

Concentration limits are derived from the analysis in the *Effects* chapter and are set at a level where we anticipate no adverse effects from the a.i. alone (Table 108). We believe setting thresholds at this level accounts for uncertainties associated with the status of the species, stressors of the action other than the a.i., other stressors identified in the environmental baseline, and cumulative effects.

Given NMFS' understanding of agricultural practices associated with these a.i., we recommend Sub-elements 1a, 1b, and 1c, as applicable to each a.i., as the most practical ways to reduce spray drift, dissolved phase runoff, and sediment bound runoff of these a.i.s into salmonid habitat.

Sub-Element 1a. Pesticide products containing pendimethalin or trifluralin shall not be applied aerially within 300 ft of salmon-bearing waters.

Rationale: At approximately 300 ft away from the flight line of aerially applied pesticides, deposition is ~ 1% of applied (Bird, et al., 2002). This Sub-Element reduces spray drift.

This restriction does not apply to granular products, which are not subject to spray drift. However, applicator must control any off-target deposition of granular product to ensure it does not enter salmon-bearing waters. Oryzalin is currently not registered for aerial uses. Aerial uses of oryzalin are not considered part of this action.

Sub-Element 1b. Pesticide products containing oryzalin or pendimethalin shall be watered-in or soil incorporated when applied to the ground within 300 ft of salmon-bearing waters. Application of these products in anticipation of rainfall meets the watering-in requirement. This element does not apply to trifluralin, as existing labels already require watering-in or soil incorporation of trifluralin.

Rationale: Pesticides which are soil incorporated are less available for runoff. This Sub-Element reduces contamination by pesticides in the dissolved phase.

Sub-Element 1c. Either a 10 ft vegetated filter strip which cannot be treated with these a.i.s or a 20 ft no-treatment zone shall be maintained between salmon-bearing waters and use sites where oryzalin, pendimethalin, or trifluralin are applied. This restriction applies to ground applications, as aerial applications are already restricted within this proximity to salmon-bearing waters by Sub-Element 1a.

Rationale: Even relatively narrow filter strips (~20ft) can reduce input of highly adsorbed pesticides (USDA, 2000). This Sub-Element reduces contamination by pesticides sorbed to eroded soil particles.

Element 2. All incidents of fish mortality occurring within the vicinity of the treatment area in the four days following application of any pesticide products containing oryzalin, pendimethalin or trifluralin, shall be reported to EPA's Office of Pesticide Programs. "Vicinity" includes areas adjacent to, downwind of, or downstream of the application area which might reasonably be affected by the application. Given environmental transport properties of these a.i.s, NMFS considers areas >1 mile from the application sites are outside of application vicinity.

Should EPA modify FIFRA 6(a)2 to require registrants to report all fish kills immediately, regardless of incident classification (*i.e.* both minor and major incidents), reporting through the FIFRA 6(a)2 process will meet this reporting requirement. EPA shall submit an annual report to NMFS OPR identifying the total number of fish affected, the incident locations, and details regarding incidents.

Table 117. Sub-elements of RPA elements 1 applicable to each ESU/DPS. Element 2 applies to all ESU/DPSs where a sub element of 1 applies. Neither Element 1 or Element 2 is applicable to those ESUs marked NA.

Species	ESU	Sub-elements that apply		
		Oryzalin	Pendimethalin	Trifluralin
Chinook	Puget Sound	NA	A, B, C	A, C
	Lower Columbia River	NA	A, B, C	A, C
	Upper Columbia River Spring - Run	NA	NA	NA
	Snake River Fall - Run	NA	NA	NA
	Snake River Spring/Summer - Run	NA	NA	NA
	Upper Willamette River	B, C	A, B, C	A, C
	California Coastal	B, C	A, B, C	A, C
	Central Valley Spring - Run	B, C	A, B, C	A, C
	Sacramento River Winter - Run	B, C	A, B, C	A, C
Chum	Hood Canal Summer - Run	NA	NA	NA
	Columbia River	NA	NA	NA
Coho	Lower Columbia River	NA	NA	A, C
	Oregon Coast	NA	NA	NA
	Southern Oregon and Northern California Coast	NA	NA	NA
	Central California Coast	B, C	A, B, C	A, C
Sockeye	Ozette Lake	NA	NA	NA
	Snake River	NA	NA	NA
Steelhead	Puget Sound	NA	A, B, C	A, C
	Lower Columbia River	NA	A, B, C	A, C
	Upper Willamette River	B, C	A, B, C	A, C
	Middle Columbia River	B, C	A, B, C	A, C
	Upper Columbia River	NA	NA	NA
	Snake River	NA	NA	NA
	Northern California	NA	NA	NA
	Central California Coast	B, C	A, B, C	A, C
	California Central Valley	B, C	A, B, C	A, C
	South-Central California Coast	B, C	A, B, C	A, C
	Southern California	NA	A, B, C	A, C

NA Not applicable, no jeopardy or adverse modification for this ESU/DPS or designated critical habitat

Incidental Take Statement

Section 9(a)(1) of the ESA prohibits the taking of endangered species without a specific permit or exemption. Protective regulations adopted pursuant to section 4(d) of the ESA extend the prohibition to threatened species. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct (50 CFR 222.102). Harm is further defined by NMFS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action, whether implemented as proposed or as modified by reasonable and prudent alternatives, is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

Amount or Extent of Take

As described earlier in this Opinion, this is a consultation on the EPA's registration of pesticide products containing oryzalin, pendimethalin, trifluralin, and their formulations as they are used in the Pacific Northwest and California and the effects of these applications on listed ESUs/DPSs of Pacific salmonids. The EPA authorizes use of these pesticide products for pest control purposes across multiple landscapes as described in the *Description of the Proposed Action* and elsewhere in the document. The goal of this Opinion is to evaluate the impacts to NMFS' listed resources from the EPA's broad authorization of applied pesticide products. This Opinion is a partial consultation because pursuant to the court's order, EPA sought consultation on only 26 listed Pacific salmonids under NMFS' jurisdiction. However, even though the court's order did not address the two more recently listed ESUs and DPSs, NMFS analyzed the impacts of EPA's actions to them because they belong to the same taxon and the analysis requires consideration of the same information. Consultation with NMFS will be completed when EPA makes effect determinations on all remaining species under NMFS' jurisdiction and consults with NMFS as necessary.

For this Opinion, NMFS anticipates the general direct and indirect effects that would occur from EPA's registration of pesticide products across the states of California, Idaho, Oregon, and Washington to 28 listed Pacific salmonids under NMFS' jurisdiction during the 15-year duration of the proposed action. Recent and historical surveys indicate listed salmonids occur in the action area, in places where they will be exposed to the stressors of the action. The RPA and RPMs provided in this Opinion are designed to reduce this exposure but not eliminate it. Pesticide runoff and drift of oryzalin, pendimethalin, and trifluralin are most likely to reach streams and other aquatic sites when they are applied to crops and other land use settings located adjacent to riparian areas, wetlands, ditches, off-channel habitats, perennial, intermittent, and ephemeral streams. Inputs into aquatic habitats are especially high when rainfall immediately follows applications particularly on impervious surfaces or when there is a high amount of rainfall. The effects of pesticides and other contaminants found in rights-of-ways and urban runoff, especially from areas with a high degree of impervious surfaces, may also exacerbate degraded water quality conditions in receiving waters. Urban runoff is also generally warmer in temperature, and elevated water temperature negatively affects certain life history phases for salmon.

The range of effects caused by the three a.i.s includes direct and indirect toxicological effects. Within this range, effects can include impairments of physiological functions to the extent that fish die or are unable to perform necessary life functions (such as predator avoidance, foraging, migration and reductions in reproductive success). More often, effects are anticipated to include reduced growth and developmental effects for fish. Effects on aquatic vegetation may decrease available energy base for the system, shift in-stream plant communities, reduce natural cover, or reduce the prey base, thereby affecting growth of fish. Incidental take of listed salmonids is reasonably certain to occur over the 15-year duration of the proposed action.

Given the variability of real-life conditions, the broad nature and scope of the proposed action, and the migratory nature of salmon, the best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take associated with the proposed action. The *Description of the Proposed Action* and the *Effects of the Proposed Action* sections

describe multiple uncertainties associated with the proposed action and the analysis thereof. Areas of uncertainty include:

1. Inability to quantify the effect of herbicides on salmon habitat due to variability in plant susceptibility to the herbicides and variability in species composition and density in the various locations;
2. Incomplete information on the proposed action (*i.e.*, no master labels summarizing all stressors of the action and all authorized uses of pesticide products);
3. Limited use and exposure data on stressors of the action for non-agricultural uses of these pesticides;
4. Minimal information on exposure and toxicity for pesticide formulations, adjuvants, and other/inert ingredients within registered formulations;
5. Minimal information on permitted tank mixtures and associated exposure estimates;
6. Limited data on toxicity of environmental mixtures;
7. Inability to quantify responses due to exposure to combinations of the three a.i.s and other stressors in the baseline;
8. Variability in annual land use, crop cover, and pest pressure;
9. Temporal and spatial variability within each ESU/DPS, especially at the population level; and
10. Size and flow variations of water bodies in which salmonids live.

NMFS therefore identifies, as a surrogate for the allowable extent of take, the ability of this action to proceed without any fish kills attributed to the legal use of oryzalin, pendimethalin, trifluralin, or any compounds, degradates, or mixtures in aquatic habitats containing individuals from any ESU/DPS. Because of the difficulty of detecting salmonid deaths, fishes killed do not have to be listed salmonids. In general, salmonids tend to be more sensitive to chemical stressors than many other species of fish, so that if there are kills of other freshwater fishes attributed to use of these pesticides, it is likely that salmonids have also died, even if no dead salmonids can be located. Additionally, if stream conditions due to pesticide use kill less sensitive fishes in certain areas, the potential for lethal and non-lethal takes in downstream areas increases. A fish kill is considered attributable to one of these three a.i.s, its metabolites, or degradates, if the a.i is known to have been applied in the vicinity, may reasonably be supposed to have run off or drifted into the affected area, and if surface water samples, or pathology indicate lethal levels of the a.i.(s).

NMFS notes that with increased monitoring and study of the impact of these pesticides on water quality, particularly water quality in off-channel habitats, NMFS may be able to refine this incidental take statement, and future incidental take statements, to allow other measures of the extent of take.

Reasonable and Prudent Measures

The measures described below are non-discretionary measures to avoid or minimize take that must be undertaken by the EPA so they become binding conditions of any grant or permit, in this case the registration and label authorizing use of an a.i., issued to the applicant(s), as appropriate, for the exemption in section 7(o)(2) to apply. The EPA has a continuing duty to regulate the activity covered by this incidental take statement. If the EPA (1) fails to assume and implement the terms and conditions implementing these measures or (2) fails to require the applicant(s) to adhere to the terms and conditions of the incidental take statement through enforceable terms added to the registration labe, the protective coverage of section 7(o)(2) lapses. In order to monitor the impact of incidental take, the EPA must report the progress of the action and its impact on the species to NMFS OPR as specified in the incidental take statement [50 CFR§402.14(i)(3)].

To satisfy its obligations pursuant to section 7(a)(2) of the ESA, the EPA must monitor (a) the direct, indirect, and cumulative impacts of its long-term registration of pesticide products containing oryzalin, pendimethalin, and trifluralin; and (b) the consequences of those effects on listed Pacific salmonids under NMFS' jurisdiction. For oryzalin, pendimethalin, and trifluralin, this monitoring consists of documenting adverse effects associated with use of these a.i.s and promptly reporting those adverse effects to NMFS. The purpose of the monitoring program is for the EPA to use the results of the monitoring data and modify the registration process in order to reduce exposure and minimize the effects of exposure when pesticides are used near salmonid habitat. NMFS believes all measures described as part of the proposed action, together with use of the Reasonable and Prudent Measures and Terms and Conditions described below, are necessary and appropriate to minimize the likelihood of incidental take of listed species due to implementation of the proposed action.

The EPA shall:

1. Minimize the amount and extent of incidental take from use of pesticide products containing oryzalin, pendimethalin, and trifluralin by reducing the potential of those chemicals to reach salmon-bearing waters;
2. Monitor any incidental take or surrogate measure of take that occurs from the action; and
3. Report annually to NMFS OPR on the take monitoring results from the previous year.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, within one year following the date of issuance of this Opinion, the EPA must comply with the following terms and conditions. These terms and conditions implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary. Terms and conditions 1 - 2 shall be either specified directly on FIFRA labels of all pesticide products containing oryzalin, pendimethalin, or trifluralin or those labels shall direct pesticide users to the EPA's Endangered Species Protection Program (ESPP) county bulletins which list Terms and Conditions 1 - 2

For all products containing oryzalin, pendimethalin, and trifluralin:

1. EPA shall use accepted pesticide risk reduction measures including but not limited to no spray zones, limitations on application methods, rates, and timing or other types of buffers to minimize pesticide loading into salmon-bearing waters.
2. EPA shall include a statement on requiring all incidents of fish mortality occurring within the vicinity of the treatment area in the four days following application of any pesticide products containing oryzalin, pendimethalin or trifluralin, be reported to EPA's Office of Pesticide Programs. "Vicinity" includes areas adjacent to, downwind of, or downstream of the application area which might reasonably be affected by the application. Given environmental transport properties of these a.i.s, NMFS considers areas >1 mile from the application sites are outside of application vicinity.

3. EPA shall report to NMFS OPR any incidences regarding oryzalin, pendimethalin, or trifluralin effects on aquatic ecosystems added to its incident database which EPA has classified as "probable" or "highly probable." within one month of receiving the incident report.

Conservation Recommendations

Section 7(a) (1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The following conservation recommendations would provide information for future consultations involving future authorizations of pesticide a.i.s that may affect listed species:

1. Collaborate with States to develop accurate and consistent methods for pesticide incident detection, reporting, and verification.
2. Conduct mixture toxicity analysis in screening-level and endangered species biological evaluations;
3. Develop models to estimate pesticide concentrations in shallow, low-flow habitats;
4. Develop models to estimate pesticide concentrations in aquatic habitats associated with non-agricultural applications, particularly in residential and industrial environments; and
5. Develop and implement a program to educate users of pesticide about the potential adverse effects on salmonids and their designated critical habitat. Educational materials should discuss measures and techniques appropriate for reducing input of pesticides to aquatic habitats.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the EPA should notify NMFS OPR of any conservation recommendations implemented in the final action.

Reinitiation Notice

This concludes formal consultation on the EPA's proposed registration of pesticide products containing oryzalin, pendimethalin, and trifluralin and their formulations to ESA-listed Pacific

salmonids under the jurisdiction of the NMFS. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the extent of take specified in the *Incidental Take Statement* is exceeded; (2) new information reveals effects of this action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered in this biological opinion; (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. If reinitiation of consultation appears warranted due to one or more of the above circumstances, EPA must contact NMFS OPR. In the event reinitiation conditions (1), (2), or (3) is met, reinitiation will be only for the a.i.(s) which meet that condition, not for all a.i.s considered in the Opinion. If none of these reinitiation triggers are met within the next 15 years, then reinitiation on this partial consultation will be required because the Opinion only covers the action for 15 years.

Attachment C

Reasonable and Prudent Alternatives

Regulations (50 CFR §402.02) implementing section 7 of the ESA define reasonable and prudent alternatives as alternative actions, identified during formal consultation, that: (1) can be implemented in a manner consistent with the intended purpose of the action; (2) can be implemented consistent with the scope of the action agency's legal authority and jurisdiction; (3) are economically and technologically feasible; and (4) NMFS believes would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat.

This Opinion has concluded that EPA's proposed registration of certain uses of 2,4-D, including aquatic uses of 2,4-D BEE are likely to jeopardize the continued existence of the 28 endangered and threatened Pacific salmonids. This Opinion has also concluded that 2,4-D, diuron, and chlorothalonil are likely to adversely modify or destroy designated critical habitat for one or more of the 28 threatened and endangered salmonids. NMFS reached these conclusions because predicted concentrations of these a.i.s in salmonid habitats are likely to cause adverse effects to Pacific salmonids, water quality, salmonid prey, natural cover, and/or substrate in freshwater rearing, spawning, and foraging areas.

The Reasonable and Prudent Alternative (RPA) accounts for the following issues: (1) the action will result in exposure to other chemical stressors in addition to the a.i. that may increase the risk of the action to listed species, including unspecified inert ingredients, adjuvants, and tank mixes; (2) exposure to chemical mixtures containing the a.i.s; and (3) exposure to other chemicals and physical stressors in the baseline habitat will likely intensify response to the a.i.s.

The action as implemented under the RPA will remove the likelihood of jeopardy and adverse modification by reducing the concentrations of each of these a.i.s and their associated stressors of the action within the designated critical habitat. In the proposed RPA, NMFS does not attempt to ensure there is no take of listed species. NMFS believes take will occur, and has provided an incidental take statement exempting that take from the take prohibitions, so long as the action is conducted according to the RPA and reasonable and prudent measures (RPM). Avoiding take

altogether would most likely entail canceling registration, or prohibiting use in watersheds inhabited by salmonids. The goal of the RPA is to reduce exposure to ensure that the action is not likely to jeopardize listed species, destroy or adversely modify critical habitat.

The RPA is comprised of seven required elements that must be implemented in its entirety within one year of the EPA's receipt of this Opinion to ensure the registration of these pesticides is not likely to jeopardize endangered or threatened Pacific salmonids under the jurisdiction of NMFS or destroy or adversely modify critical habitat designated for these species. For each active ingredient, the elements of the RPA apply only to those ESUs/DPSs where NMFS has determined that registration of that a.i. is likely to jeopardize listed species and/or destroy or adversely modify designated critical habitat (Table 148and Table 149). These elements rely upon recognized practices for reducing the loading of pesticide products into aquatic habitats.

Specific Elements of the Reasonable and Prudent Alternative

Elements 1-7 shall be specified on FIFRA labels of all pesticide products containing 2,4-D, diuron, and chlorothalonil when used within ESUs or DPSs where jeopardy or adverse modification of designated critical habitat has been determined. Alternatively, the label could direct pesticide users to the EPA's Endangered Species Protection Program (ESPP) bulletins that specify elements 1-7 in the applicable counties. The derivation of concentration limits used in the elements below is described in Appendix 1.

Element 1. The following applies to broadcast spray applications of pesticide products containing 2,4-D, diuron, and chlorothalonil in applicable ESUs or DPSs. These pesticides shall only be broadcast applied when there is minimal potential for drift to listed salmonid-bearing waters. Do not apply when wind speeds are below 2 mph or exceed 10 mph, except when winds in excess of 10 mph will carry drift away from salmonid-bearing waters.

Element 2. Do not apply pesticide products containing 2,4-D, diuron, or chlorothalonil when soil is saturated, or when a precipitation event , likely to produce direct runoff to salmonid-

bearing waters from the treated area, is forecasted by NOAA/NWS (National Weather Service) or other similar forecasting service within 48 h following application.

Element 3. 2,4-D BEE specific requirements:
Do not apply pesticide products containing 2,4-D butoxyethyl ester directly to any surface waters accessible to listed salmonids.

Element 4. 2,4-D specific requirements designed to protect native riparian vegetation and designated critical habitat.

1. Do not apply 2,4-D directly to native riparian vegetation except as part of a native riparian vegetation restoration project. Control of invasive plants within the riparian habitat shall be by individual plant treatments for woody species, and spot treatment of less than 1/10 acre for herbaceous species.
2. EPA will implement NMFS approved risk reduction measures to ensure maximum concentrations of terrestrially applied 2,4-D do not exceed a peak of 100 μg/L in salmonid-bearing waters.[15]

Element 5. Diuron-specific requirements within areas designated critical as habitat for the specified ESU/DPSs in Table 149. This element is designed to protect native riparian vegetation and reduce direct exposure to listed fish:

[15] Within ESUs or DPSs where jeopardy or adverse modification of designated critical habitat has been determined, EPA will implement NMFS approved risk reduction measures to ensure maximum concentrations of the a.i.s predicted in salmonid bearing waters or associated native riparian vegetation will not exceed the specified value. NMFS encourages EPA to take into account existing state programs that reduce exposure potential to salmonid-bearing waters when developing protocols. These values represent the highest concentrations that may be achieved in salmonid habitats, rather than time-weighted average concentrations, and consider the range in potential droplet size spectrum, release heights, wind speeds, and wind directions that may be associated with all labeled application methods (*e.g.,* agricultural applications, vector control in public health programs, *etc*.). The maximum predicted concentrations shall account for potential contributions from both runoff and drift to salmonid habitats, as appropriate. Risk reduction measures shall account for the predicted maximum concentrations in all salmonid-bearing water, including a modeled floodplain habitat of 1-2 m wide and 0.1 m deep. They shall also account for potential increases in aquatic concentrations associated with the maximum application rate and the maximum number of times an a.i. may be applied per season according to label restrictions.

1. Do not apply diuron directly to native riparian vegetation.
2. Do not apply diuron to intermittently flooded low lying sites, marshes, swamps, and bogs that may be seasonally connected to habitats that contain listed salmonids.
3. EPA will implement NMFS approved risk reduction measures to ensure diuron drift to native riparian vegetation does not exceed 0.10 lbs/A[13].
4. When native riparian vegetation is not present, EPA will implement NMFS approved risk reduction measures to ensure maximum concentrations of diuron do not exceed 5.0 μg/L in salmonid-bearing waters.

Element 6. Chlorothalonil-specific requirements within areas designated as critical habitat for the specified ESU/DPSs in Table 149.

1. EPA will implement NMFS approved risk reduction measures to ensure maximum concentrations of chlorothalonil do not exceed a peak concentration of 1.05 μg/L, or a 21 d time-weighted-average concentration of 0.18 μg/L in salmonid-bearing waters.[13,16] Reduction measures may include reduced single and annual application rates.
2. Application to conifers will be limited to the following uses: (i) conifer nursery beds; (ii) Christmas tree and bough production plantations; (iii) tree seed orchards; and (iv) landscape situations (ornamental or specimen trees in a residential or commercial landscape).

Element 7. Report all incidents of fish mortality that occur within the vicinity of the treatment area, including areas downstream and downwind, and in the four days following application of these a.i.s to EPA's Office of Pesticide Programs. Alternatively, these incidents may be reported to the pesticide manufacturer through the phone number on the product label once EPA modifies FIFRA 6(a)2 to require registrants to report all fish kills immediately, regardless of incident classification (*i.e.* both minor and major incidents). EPA shall submit an annual report to NMFS OPR that identifies the total number of fish affected and incident locations.

[16] Calculation of 21 d time-weighted-average shall be for a static floodplain habitat (2 m wide and 0.1 m deep) and include the evaluation of maximum annual application rates according to label restrictions.

Because this Opinion has found jeopardy and destruction or adverse modification to designated critical habitat, the EPA is required to notify NMFS of its final decision on the implementation of the reasonable and prudent alternatives (50 CFR §402.15(b)). ESU/DPS applicable reasonable and prudent alternatives have been summarized in Table 150.

Table 150. RPA elements (1 - 7) applicable to each ESU/DPS and to each a.i. combination.

Species	ESU	Herbicides: RPA Elements that apply				Fungicides: RPA Elements that apply	
		2,4-D	Triclopyr BEE	Diuron	Linuron	Captan	Chlorothalonil
Chinook	Puget Sound	1,2,3,7		1,2,5,7			1,2,6,7
	Lower Columbia River	1,2,3,7		1,2,5,7			
	Upper Columbia River Spring - Run	1,2,3,7					
	Snake River Fall - Run	1,2,3,7					
	Snake River Spring/Summer - Run	1,2,3,7					
	Upper Willamette River	1,2,3,4,7		1,2,5,7			1,2,6,7
	California Coastal	1,2,3,7					
	Central Valley Spring - Run	1,2,3,4,7		1,2,5,7			1,2,6,7
	Sacramento River Winter - Run	1,2,3,4,7		1,2,5,7			1,2,6,7
Chum	Hood Canal Summer - Run	1,2,3,7					
	Columbia River	1,2,3,7					
Coho	Lower Columbia River	1,2,3,7					
	Oregon Coast	1,2,3,7					
	Southern Oregon and Northern California Coast	1,2,3,7					
	Central California Coast	1,2,3,7					1,2,6,7
Sockeye	Ozette Lake	1,2,3,7					
	Snake River	1,2,3,7					
Steelhead	Puget Sound	1,2,3,7					
	Lower Columbia River	1,2,3,7		1,2,5,7			
	Upper Willamette River	1,2,3,4,7		1,2,5,7			1,2,6,7
	Middle Columbia River	1,2,3,7					
	Upper Columbia River	1,2,3,7					
	Snake River	1,2,3,7					
	Northern California	1,2,3,7					
	Central California Coast	1,2,3,4,7		1,2,5,7			1,2,6,7
	California Central Valley	1,2,3,4,7		1,2,5,7			1,2,6,7
	South-Central California Coast	1,2,3,7					1,2,6,7
	Southern California	1,2,3,7					1,2,6,7

Incidental Take Statement

Section 9(a)(1) of the ESA prohibits the taking of endangered species without a specific permit or exemption. Protective regulations adopted pursuant to section 4(d) of the ESA extend the prohibition to threatened species. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct (50 CFR 222.102). Harm is further defined by NMFS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action, whether implemented as proposed or as modified by reasonable and prudent alternatives, is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

Amount or Extent of Take

As described earlier in this Opinion, this is a consultation on the EPA's registration of pesticide products containing 2,4-D, triclopyr BEE, diuron, linuron, captan, chlorothalonil, and their formulations as they are used in the Pacific Northwest and California and the effects of these applications on listed ESUs/DPSs of Pacific salmonids. The EPA authorizes use of these pesticide products for pest control purposes across multiple landscapes as described in the *Description of the Proposed Action* and elsewhere in the document. The goal of this Opinion is to evaluate the impacts to NMFS' listed resources from the EPA's broad authorization of applied pesticide products. This Opinion is a partial consultation because pursuant to the court's order, EPA sought consultation on only 26 listed Pacific salmonids under NMFS' jurisdiction. However, even though the court's order did not address the two more recently listed ESUs and DPSs, NMFS analyzed the impacts of EPA's actions to them because they belong to the same taxon and the analysis requires consideration of the same information. Consultation with NMFS will be completed when EPA

makes effect determinations on all remaining species under NMFS' jurisdiction and consults with NMFS as necessary.

For this Opinion, NMFS anticipates the general direct and indirect effects that would occur from EPA's registration of pesticide products across the states of California, Idaho, Oregon, and Washington to 28 listed Pacific salmonids under NMFS' jurisdiction during the 15-year duration of the proposed action. Recent and historical surveys indicate that listed salmonids occur in the action area, in places where they will be exposed to the stressors of the action. The RPA above and RPMs below provided in this Opinion are designed to reduce this exposure but not eliminate it. Pesticide runoff and drift of 2,4-D, triclopyr BEE, diuron, linuron, captan, and chlorothalonil are most likely to reach streams and other aquatic sites when they are applied to crops and other land use settings located adjacent to wetlands, riparian areas, ditches, off-channel habitats, perennial, intermittent, and ephemeral streams. These inputs into aquatic habitats are especially high when rainfall immediately follows applications. The effects of pesticides and other contaminants found in right of ways and urban runoff, especially from areas with a high degree of impervious surfaces, may also exacerbate degraded water quality conditions of receiving waters used by salmon. Urban runoff is also generally warmer in temperature, and elevated water temperature poses negative effects on certain life history phases for salmon.

The range of effects of the six a.i.s on salmonids includes direct and indirect toxicological effects. Within this range, effects include impairments of physiological functions to the extent that fish die or are unable to perform necessary life functions (such as predator avoidance, foraging, migration and reductions in reproductive success). Adverse impacts to riparian vegetation could lead to increased water temperature, increased sedimentation from bank instability, reductions in cover, alterations to or decreases in prey production, and reduction in chemical and nutrient filtering from upland sources. Impacts to aquatic vegetation would reduce dissolved oxygen, natural cover, alter or reduce the prey base, affect growth, and lead to an increased susceptibility to predation. These results are not the purpose of the proposed action. Therefore, incidental take of listed salmonids is reasonably certain to occur over the 15-year duration of the proposed action.

Given the variability of real-life conditions, the broad nature and scope of the proposed action, and the migratory nature of salmon, the best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take associated with the proposed action. As explained in the *Description of the Proposed Action* and the *Effects of the Proposed Action* sections, NMFS identified multiple uncertainties associated with the proposed action. Areas of uncertainty include:

1. Unable to quantify effect of herbicides on salmon habitat due to variability in plant susceptibility to the herbicides and variability in species composition and density in the various locations.
2. Incomplete information on the proposed action (*i.e.,* no master labels summarizing all stressors of the action and all authorized uses of pesticide products). ;
3. Limited use and exposure data on stressors of the action for non-agricultural uses of these pesticides;
4. Minimal information on exposure and toxicity for pesticide formulations, adjuvants, and other/inert ingredients within registered formulations;
5. Little information on permitted tank mixtures and associated exposure estimates;
6. Limited data on toxicity of environmental mixtures;
7. Responses from exposure to combinations of the 6 a.i.s and other stressors in the baseline;
8. Annual variable conditions regarding land use, crop cover, and pest pressure;
9. Variable temporal and spatial conditions within each ESU, especially at the population-level; and
10. Variable conditions of water bodies in which salmonids live.

NMFS therefore identifies, as a surrogate for the allowable extent of take, the ability of this action to proceed without any fish kills attributed to the legal use of 2,4-D, triclopyr BEE, diuron, linuron, captan, or chlorothalonil, or any compounds, degradates, or mixtures in aquatic habitats containing individuals from any ESU/DPS. Because of the difficulty of detecting salmonid deaths, the fishes killed do not have to be listed salmonids. In general, salmonids appear to be more sensitive to these a.i.s than many other species of fish, so that if there are kills of other freshwater fishes attributed to use of these pesticides, it is likely that salmonids have also died, even if no dead salmonids can be located. In addition, if stream conditions due to pesticide use kill less sensitive fishes in certain areas, the potential for lethal and non-lethal takes in downstream areas increases. A fish kill is considered attributable to one of these six ingredients, its metabolites, or degradates, if the a.i is

known to have been applied in the vicinity, may reasonably be supposed to have run off or drifted into the affected area, and if surface water samples, or pathology indicate lethal levels of the a.i.(s).

NMFS notes that with increased monitoring and study of the impact of these pesticides on water quality, particularly water quality in off-channel habitats, NMFS will be able to refine this incidental take statement, and future incidental take statements, to allow other measures of the extent of take.

Reasonable and Prudent Measures

The measures described below are non-discretionary measures to avoid or minimize take that must be undertaken by the EPA so that they become binding conditions of any grant or permit issued to the applicant(s), as appropriate, for the exemption in section 7(o)(2) to apply. The EPA has a continuing duty to regulate the activity covered by this incidental take statement. If the EPA (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant(s) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the EPA must report the progress of the action and its impact on the species to NMFS OPR as specified in the incidental take statement [50 CFR§402.14(i)(3)].

To satisfy its obligations pursuant to section 7(a)(2) of the ESA, the EPA must monitor (a) the direct, indirect, and cumulative impacts of its long-term registration of pesticide products containing 2,4-D, triclopyr BEE, diuron, linuron, captan, or chlorothalonil; and (b) the consequences of those effects on listed Pacific salmonids under NMFS' jurisdiction. The purpose of the monitoring program is for the EPA to use the results of the monitoring data and modify the registration process in order to reduce exposure and minimize the effect of exposure where pesticides will occur in salmonid habitat. NMFS believes all measures described as part of the proposed action, together with use of the Reasonable and Prudent Measures and Terms and Conditions described below, are necessary and appropriate to minimize the likelihood of incidental take of listed species due to implementation of the proposed action.

The EPA shall:

1. Minimize the amount and extent of incidental take from use of pesticide products containing 2,4-D, triclopyr BEE, diuron, linuron, captan, or chlorothalonil by reducing the potential of these chemicals to reach salmon-bearing waters;
2. Minimize the effects of 2,4-D during direct water applications;
3. Monitor any incidental take or surrogate measure of take that occurs from the action; and
4. Report annually to NMFS OPR on the monitoring results from the previous year.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, within one year following the date of issuance of this Opinion, the EPA must comply with the following terms and conditions. These terms and conditions implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary. Terms and conditions 1, 3, and 6(a).shall be specified on FIFRA labels of all pesticide products containing 2,4-D, triclopyr BEE, diuron, linuron, captan, and chlorothalonil. Alternately, the labels could direct pesticide users to the EPA's ESPP bulletins that specify these terms and conditions.

1. This pesticide shall only be broadcast applied when there is minimal potential for drift to listed salmonid-bearing waters. Do not broadcast spray when wind speeds are below 2 mph or exceed 10 mph, except when winds in excess of 10 mph will carry drift away from salmonid-bearing waters.

2. Products containing 2,4-D (except 2,4-D BEE) may be applied to salmon bearing waters providing the following:
    a. Applications are only to control non-native (exotic) invasive plant species;
    b. Applications are only during timing windows provided in Appendix 9 (page 967), and
    c. Applications will minimally affect non-target native vegetation.

3. Do not apply pesticide products containing 2,4-D, triclopyr BEE, diuron, linuron, captan, or chlorothalonil (include only relevant a.i. or pesticide product name on label/bulletin) when soil is saturated , or when a precipitation event likely to produce direct runoff to salmon bearing waters from the treated area is forecasted by NOAA/NWS (National Weather Service) or other similar forecasting service within 48 h following application.

4. Do not apply diuron to intermittently flooded low lying sites, marshes, swamps, and bogs that may be seasonally connected to habitats that contain listed salmonids.

5. Chlorothalonil applications to conifers will be limited to the following uses: (i) conifer nursery beds; (ii) Christmas tree and bough production plantations; (iii) tree seed orchards; and (iv) landscape situations (ornamental or specimen trees in a residential or commercial landscape).

6. Regarding all products containing 2,4-D, triclopyr BEE, diuron, linuron, captan, and chlorothalonil:

    a. EPA shall include the following instructions requiring reporting of fish kills either on the labels or ESPP Bulletins :

    NOTICE: Incidents where salmon appear injured or killed as a result of pesticide applications shall be reported to NMFS OPR at 301-713-1401 and EPA's Office of Pesticide Programs. The finder should leave the fish alone, make note of any circumstances likely causing the death or injury, location and number of fish involved, and take photographs, if possible. Adult fish should generally not be disturbed unless circumstances arise where an adult fish is obviously injured or killed by pesticide exposure, or some unnatural cause. The finder may be asked to carry out instructions provided by NMFS OPR to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.

b. EPA shall report to NMFS OPR any incidences regarding 2,4-D, triclopyr BEE, diuron, linuron, captan, or chlorothalonil effects on aquatic ecosystems added to its incident database that EPA has classified as "probable" or "highly probable."

7. In addition to the labeling requirements above, EPA shall develop and implement a NMFS-approved effectiveness monitoring plan for floodplain habitats, and produce annual reports of the results. NMFS encourages EPA to work with local, state, and other agencies to assist in plan development and implementation. The plan shall identify representative floodplain habitats prone to drift and runoff of pesticides within agricultural and non-agricultural areas. The representative sampling sites shall include habitats currently used by threatened and endangered Pacific salmonids, as identified by NMFS biologists. Sampling sites include at least two sites for each general species (*i.e.,* coho salmon, chum salmon, steelhead, sockeye salmon, and ocean-type Chinook and stream-type Chinook salmon). Sampling shall consist of daily collection of surface water samples for seven consecutive days during three periods of high application for 2,4-D, triclopyr BEE, diuron, linuron, captan and chlorothalonil. The report shall be submitted to NMFS OPR and will summarize annual monitoring data and provide all raw data.

Conservation Recommendations

Section 7(a) (1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The following conservation recommendations would provide information for future consultations involving future authorizations of pesticide a.i.s that may affect listed species:

1. Conduct mixture toxicity analysis in screening-level and endangered species biological evaluations;
2. Develop models to estimate pesticide concentrations in off-channel habitats; and

3. Develop models to estimate pesticide concentrations in aquatic habitats associated with non-agricultural applications, particularly in residential and industrial environments.
4. Develop and implement a program to educate users of pesticide about the potential adverse effects on salmonids and their designated critical habitat. Educational materials should discuss measures and techniques appropriate for reducing input of pesticides to aquatic habitats.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the EPA should notify NMFS OPR of any conservation recommendations it implements in the final action.

Reinitiation Notice

This concludes formal consultation on the EPA's proposed registration of pesticide products containing 2,4-D, triclopyr BEE, diuron, linuron, captan, chlorothalonil, and their formulations to ESA-listed Pacific salmonids under the jurisdiction of the NMFS. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the extent of take specified in the *Incidental Take Statement* is exceeded; (2) new information reveals effects of this action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered in this biological opinion; (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. If reinitiation of consultation appears warranted due to one or more of the above circumstances, EPA must contact NMFS OPR. In the event reinitiation conditions (1), (2), or (3) is met, reinitiation will be only for the a.i.(s) which meet that condition, not for all 6 a.i.s considered in the Opinion. If none of these reinitiation triggers are met within the next 15 years, then reinitiation will be required because the Opinion only covers the action for 15 years.

Attachment D

Reasonable and Prudent Alternatives

Regulations (50 CFR §402.02) implementing section 7 of the ESA define reasonable and prudent alternatives as alternative actions, identified during formal consultation, that: (1) can be implemented in a manner consistent with the intended purpose of the action; (2) can be implemented consistent with the scope of the action agency's legal authority and jurisdiction; (3) are economically and technologically feasible; and (4) NMFS believes would avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat.

This Opinion has concluded that EPA's proposed registration of pesticides containing bensulide, dimethoate, ethoprop, methidathion, naled, phorate, and phosmet are each likely to jeopardize the continued existence of one or more of the 28 endangered and threatened Pacific salmonids and are each likely to destroy or adversely modify designated critical habitat for one or more of the 28 threatened and endangered salmonids. "Jeopardize the continued existence of" means "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR §402.02).

NMFS reached this conclusion because predicted concentrations of these seven a.i.s in salmonid habitats, particularly in floodplain habitats[17], are likely to cause adverse effects to at least one ESU or DPS of listed Pacific salmonids including significant reductions in growth or survival.

As a result, twenty-three ESUs/DPSs of listed Pacific salmonids are likely to suffer reductions in viability from at least one of the a.i.s given the severity of expected changes

[17] Floodplain habitat – water bodies and/or inundated areas that are connected (accessible to salmonid juveniles) seasonally or annually to the main channel of a stream including but not limited to features such as side channels, alcoves, ox bows, ditches, and tributaries.

Main channel –the stream channel that includes the thalweg (longitudinal continuous deepest portion of the channel.

in abundance and productivity associated with the proposed action. These adverse effects are expected to appreciably reduce the likelihood of both the survival and recovery of these listed Pacific salmonids. EPA's proposed registration of bensulide, dimethoate, ethoprop, methidathion, naled, phorate, and phosmet likely to jeopardize 23 ESUs and not likely to jeopardize 5 ESUs. EPA's proposed registration of bensulide, dimethoate, ethoprop, methidathion, naled, phorate, and phosmet is also likely to result in the destruction or adverse modification of critical habitat for 25 affected ESUs/DPSs because of adverse effects from at least one active ingredient on salmonid prey and water quality in freshwater rearing, spawning, and foraging areas.

The Reasonable and Prudent Alternative (RPA) accounts for the following issues: (1) the action will result in exposure to other chemical stressors in addition to the a.i. that may increase the risk of the action to listed species, including unspecified inert ingredients, adjuvants, and tank mixes; (2) exposure to chemical mixtures containing the a.i.s and other cholinesterase-inhibiting compounds result in additive and synergistic responses; and (3) exposure to other chemicals and physical stressors (*e.g.,* temperature) in the baseline habitat will likely intensify response to the a.i.s.

The action as implemented under the RPA will remove the likelihood of jeopardy and of destruction or adverse modification of critical habitat by reducing the concentrations of each of these a.i.s to below concentrations predicted cause significant declines in model population lambdas, (a measure of abundance and productivity). In the proposed RPA, NMFS does not attempt to ensure there is no take of listed species. NMFS believes take will occur, and has provided an incidental take statement exempting that take from the take prohibitions, so long as the action is conducted according to the RPA and reasonable and prudent measures (RPM). Avoiding take altogether would most likely entail canceling registration, or prohibiting use in watersheds inhabited by salmonids. NMFS recognizes the registration of methidathion is canceled and exposure to this a.i.s will decline accordingly. However, the terms of the cancellation for this a.i.s have provisions allowing for pesticide product sales and use to continue for several years, with no specific end date. The RPA therefore applies to methidathion in the geographic area of those ESUs or DPSs for which NMFS determined that there was likely jeopardy or likely

adverse modification or both. The goal of the RPA is to reduce exposure to ensure that the action is not likely to jeopardize listed species or destroy or adversely modify critical habitat.

The RPA is comprised of five required elements that must be implemented in its entirety within one year of the EPA's receipt of this Opinion to ensure the registration of these pesticides is not likely to jeopardize endangered or threatened Pacific salmonids under the jurisdiction of NMFS or destroy or adversely modify critical habitat designated for these species. For each active ingredient, the elements of the RPA apply only to those ESUs/DPSs where NMFS has determined that registration of that a.i. causes likely jeopardy or the destruction or adverse modification of critical habitat (Table 194 through Table 197). These elements rely upon recognized practices for reducing drift and runoff of pesticide products into aquatic habitats.

Specific Elements of the Reasonable and Prudent Alternative

Elements 1-4 shall be specified on FIFRA labels of all pesticide products containing bensulide, dimethoate, ethoprop, methidathion, naled, phorate, and phosmet. Alternatively, the label could direct pesticide users to the EPA's Endangered Species Protection Program (ESPP) bulletins that specify elements 1-4. For purposes of this RPA salmonid habitats are defined as freshwaters, estuarine habitats, and nearshore marine habitats including bays within the ESU/DPS ranges including migratory corridors. The freshwater habitats include intermittent streams and other habitats temporally connected to salmonid-bearing waters when those habitats contain water. Freshwater habitats also include all known types of floodplain habitats as well as drainages, ditches, and other man-made conveyances to salmonid habitats that lack salmonid exclusion devices (*e.g.*, screens).

Element 1. Do not apply when wind speeds are greater than or equal to 10 mph.

Element 2. For all uses do not apply pesticide products when soil moisture is at field capacity, or when a storm event likely to produce runoff from the treated area is

forecasted by to occur within 48 h following application by NOAA/NWS (National Weather Service) or other similar forecasting service.

Element 3. EPA will implement NMFS approved risk reduction measures to ensure maximum concentrations of the a.i.s predicted in salmonid habitats will not exceed the values specified in Table 198 for any allowed use. These values represent the highest concentrations that may be achieved in salmonid habitats, rather than time-weighted average concentrations, considering the range in potential droplet size spectrum, release heights, wind speeds, and wind directions that may be associated with all labeled application methods (*e.g.*, agricultural applications, vector control in public health programs, *etc*.). The maximum predicted concentrations shall account for potential contributions from both runoff and drift to salmonid habitats, as appropriate. Risk reduction measures shall account for the predicted maximum concentrations in all salmonid habitats, including a modeled floodplain habitat of 1-2 m wide and 0.1 m deep. They shall also account for potential increases in aquatic concentrations associated with the maximum application rate and the maximum number of times an a.i. may be applied per season according to label restrictions. Risk reductions measures may include, but are not limited to:

a) Buffers – Example: Do not apply pesticide products containing the a.i. within specified distances of salmonid habitats. Buffers only apply when water exists in the stream or habitat and shall be measured from the water's edge of salmonid habitat, including floodplain, to the point of deposition (below spray nozzle).
b) Vegetated filter strips- Example: Provide a 20 ft (6.1 m) minimum strip of non-crop vegetation (on which no pesticides shall be applied) on the downhill side of the application site immediately adjacent to any surface waters that have a connection to salmonid-bearing waters. This includes drainage systems that have salmonid exclusion devices, but drain to salmonid-bearing waters.
c) Reduction in the maximum single application rate, or maximum seasonal application rate - Example: Do not apply more than 1.5 lbs a.i./A/application or more than 4.5 lbs a.i./A/season.
d) Reduction in the number of applications allowed, or increase in the minimum application interval. Example: Do not apply more this a.i. more than 10 times per season. Allow a minimum of 7 days between applications.
e) Restrictions on application methods- Example: Apply by ground application methods only.
f) Restrictions on use sites- Example: prohibit applications of a.i. on high risk use sites such as "swamps" and "tidal marshes."

Table 198. Maximum concentration limits for active ingredients in salmonid habitat

Active Ingredient	Maximum Concentration Limit for salmonid habitat µg/L
Bensulide	200
Dimethoate	60
Ethoprop	20
Methidathion	0.3
Naled	0.2
Phorate	0.1
Phosmet	0.5

The maximum concentration limits in Table 198 are approximately two-fold lower than concentrations associated with significant decreases in population growth rates (lambda). These values were selected by considering the likelihood that model estimates accurately predict reductions in population growth rate by weighing the model assumptions, model limitations, and other pesticide-specific considerations (Table 199). For example, some of the model assumptions increase the likelihood that risk is overestimated (*e.g.*, all individuals of the population are exposed) while others increase the likelihood that risk is underestimated (*e.g.*, reproductive impacts will not contribute to declines in population growth rate. The maximum concentrations limits were established by weighing model assumptions (as shown in Table 199) and other considerations regarding the risk associated with the use of pesticide product containing the a.i.s.

Table 199. Considerations for developing maximum concentration limits for salmonid habitats

Model assumptions and other assumptions and considerations	Increase likelihood that risk of significant reduction in population growth rate is overestimated	Increase likelihood that risk of significant reduction in population growth rate is underestimated
4-day exposure assumed versus maximum concentration limit	X	
Assumption that all individuals of the population exposed	X	
Assumption that toxicity inputs accurately reflect sensitivity of listed salmonids and their prey	May either overestimate or underestimate risk	
Control population assumptions (survival rate, reproductive contributions, *etc.*)	May either overestimate or underestimate risk	
Uncertainty associated with effectiveness of risk reduction method employed (e.g. buffers)	May either overestimate or underestimate risk	
Assumption that population will experience a single exposure event		X

Model assumptions and other assumptions and considerations	Increase likelihood that risk of significant reduction in population growth rate is overestimated	Increase likelihood that risk of significant reduction in population growth rate is underestimated
Assumption that lethality or somatic growth may impact population growth rate, but not both concurrently		X
Assumption that no baseline stressors (*e.g.* temp) will increase response		X
Assumption that exposure to other AChE inhibitors will not occur or increase response		X
Assumption that other a.i.s in pesticide formulations will not increase response		X
Assumption that inerts ingredients in the pesticide formulation will not increase response		X
Assumption that tank mixture ingredients will not increase response		X
Assumption that other known, unknown, or uncertain effects will not contribute to declines in population growth rates (*e.g.* impacts to reproductive endpoints)		X

Element 4. Report all incidents of fish mortality that occur within the vicinity of the treatment area, including areas downstream and downwind, in the four days following application of and of these a.i.s to EPA OPP (703-305-7695). Alternatively, these incidents may be reported to the pesticide manufacturer through the phone number on the product label once EPA modifies FIFRA 6(a)2 to require registrants to report all fish kills immediately, regardless of incident classification (*i.e.* both minor and major incidents). EPA shall submit an annual report to NMFS OPR that identifies the total number of fish affected and incident locations.

Element 5. In addition to the labeling requirements above, EPA shall develop and implement a NMFS-approved effectiveness monitoring plan for floodplain habitats, and produce annual reports of the results. The plan shall identify representative floodplain habitats prone to drift and runoff of pesticides within agricultural areas. The representative floodplain habitat sampling sites shall include floodplain habitats currently used by threatened and endangered Pacific salmonids, as identified by NMFS biologists. Sampling sites include at least two sites for each general species (*i.e.*, coho salmon, chum salmon, steelhead, sockeye salmon, and ocean-type Chinook and stream-type Chinook salmon). Sampling shall consist of daily collection of surface water samples for seven

consecutive days during three periods of high application for these a.i.s. Collected water samples will be analyzed for current-use OPs and carbamates following USGS schedule for analytical chemistry. The report shall be submitted to NMFS OPR and will summarize annual monitoring data and provide all raw data.

Because this Opinion has found jeopardy and destruction or adverse modification to designated critical habitat, the EPA is required to notify NMFS of its final decision on the implementation of the reasonable and prudent alternatives (50 CFR §402.15(b)).

Incidental Take Statement

Section 9(a)(1) of the ESA prohibits the taking of endangered species without a specific permit or exemption. Protective regulations adopted pursuant to section 4(d) of the ESA extend the prohibition to threatened species. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct (50 CFR 222.102). Harm is further defined by NMFS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action, whether implemented as proposed or as modified by reasonable and prudent alternatives, is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

Amount or Extent of Take Anticipated

As described earlier in this Opinion, this is a consultation on the EPA's registration of pesticide products containing azinphos methyl, bensulide, dimethoate, disulfoton, ethoprop, fenamiphos, methamidophos, methyl parathion, naled, phorate, or phosmet, and their formulations as they are used in the Pacific Northwest and California and the impacts of these applications on listed ESUs/DPSs of Pacific salmonids. The EPA

authorizes use of these pesticide products for pest control purposes across multiple landscapes. The goal of this Opinion is to evaluate the impacts to NMFS' listed resources from the EPA's broad authorization of applied pesticide products. This Opinion is a partial consultation because pursuant to the court's order, EPA sought consultation on only 26 listed Pacific salmonids under NMFS' jurisdiction. However, even though the court's order did not address the two more recently listed ESUs and DPSs, NMFS analyzed the impacts of EPA's actions to them because they belong to the same taxon and the analysis requires consideration of the same information. Consultation with NMFS will be completed when EPA makes effect determinations on all remaining species under NMFS' jurisdiction and consults with NMFS as necessary.

For this Opinion, NMFS anticipates the general direct and indirect effects that would occur from EPA's registration of pesticide products across the states of California, Idaho, Oregon, and Washington to 28 listed Pacific salmonids under NMFS' jurisdiction during the 15-year duration of the proposed action. Recent and historical surveys indicate that listed salmonids occur in the action area, in places where they will be exposed to the stressors of the action. The RPAs are designed to reduce this exposure but not eliminate it. Pesticide runoff and drift of azinphos methyl, bensulide, dimethoate, disulfoton, ethoprop, fenamiphos, methamidophos, methidathion, methyl parathion, naled, phorate, and phosmet are most likely to reach streams and other aquatic sites when they are applied to crops and other land use settings located adjacent to wetlands, riparian areas, ditches, off-channel habitats, and intermittent streams. These inputs into aquatic habitats are especially high when rainfall immediately follows applications. The effects of pesticides and other contaminants found in urban runoff, especially from areas with a high degree of impervious surfaces, may also exacerbate degraded water quality conditions of receiving waters used by salmon. Urban runoff is also generally warmer in temperature, and elevated water temperature poses negative effects on certain life history phases for salmon. The range of effects of the 12 a.i.s on salmonids includes reductions in growth, prey capture, and swimming ability, impaired olfaction affecting homing and reproductive behaviors, and increased susceptibility to predation and disease. Thus, we expect some exposed fish will respond to these effects by changing normal behaviors. In some cases, fish may die, be injured, or suffer sublethal effects. These results are not the

purpose of the proposed action. Therefore, incidental take of listed salmonids is reasonably certain to occur over the 15-year duration of the proposed action.

Given the variability of real-life conditions, the broad nature and scope of the proposed action, and the migratory nature of salmon, the best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take associated with the proposed action. As explained in the *Description of the Proposed Action* and the *Effects of the Proposed Action* sections, NMFS identified multiple uncertainties associated with the proposed action. Areas of uncertainty include:

1. Incomplete information on the proposed action (*i.e.,* no master label summarizing all authorized uses of pesticide products azinphos methyl, bensulide, dimethoate, disulfoton, ethoprop, fenamiphos, methamidophos, methyl parathion, naled, phorate, and phosmet);
2. Limited use and exposure data on stressors of the action for non-agricultural uses of these pesticides;
3. Minimal information on exposure and toxicity for pesticide formulations, adjuvants, and other/inert ingredients within registered formulations;
4. No information on permitted tank mixtures and associated exposure estimates;
5. Limited data on toxicity of environmental mixtures;
6. No known method to predict synergistic responses from exposure to combinations of the 12 a.i.s;
7. Annual variable conditions regarding land use, crop cover, and pest pressure;
8. Variable temporal and spatial conditions within each ESU, especially at the population-level; and
9. Variable conditions of water bodies in which salmonids live.

NMFS therefore identifies, as a surrogate for the allowable extent of take, the ability of this action to proceed without any fish kills attributed to the legal use of azinphos methyl, bensulide, dimethoate, disulfoton, ethoprop, fenamiphos, methamidophos, methyl parathion, naled, phorate, or phosmet, or any compounds, degradates, or mixtures in aquatic habitats containing individuals from any ESU/DPS. Because of the difficulty of detecting salmonid deaths, the fishes killed do not have to be listed salmonids. In general, salmonids appear to be more sensitive to these a.i.s than many other species of fish, so that if there are kills of other freshwater fishes attributed to use of these pesticides, it is likely that salmonids have also died, even if no dead salmonids can be

located. In addition, if stream conditions due to pesticide use kill less sensitive fishes in certain areas, the potential for lethal and non-lethal takes in downstream areas increases. A fish kill is considered attributable to one of these 12 ingredients, its metabolites, or degradates, if the a.i is known to have been applied in the vicinity and may reasonably be supposed to have run off or drifted into the affected area, and if surface water samples, AChE measurement, or pathology indicate lethal levels of the a.i.(s).

NMFS notes that with increased monitoring and study of the impact of these pesticides on water quality, particularly water quality in off-channel habitats, NMFS will be able to refine this incidental take statement, and future incidental take statements, to allow other measures of the extent of take.

Reasonable and Prudent Measures

The measures described below are non-discretionary measures to avoid or minimize take that must be undertaken by the EPA so that they become binding conditions of any grant or permit issued to the applicant(s), as appropriate, for the exemption in section 7(o)(2) to apply. The EPA has a continuing duty to regulate the activity covered by this incidental take statement. If the EPA (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant(s) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the EPA must report the progress of the action and its impact on the species to NMFS OPR as specified in the incidental take statement [50 CFR§402.14(i)(3)].

To satisfy its obligations pursuant to section 7(a)(2) of the ESA, the EPA must monitor (a) the direct, indirect, and cumulative impacts of its long-term registration of pesticide products containing azinphos methyl, bensulide, dimethoate, disulfoton, ethoprop, fenamiphos, methamidophos, methyl parathion, naled, phorate, or phosmet; (b) evaluate the direct, indirect, or cumulative impacts of pesticide misapplications in the aquatic habitats in which they occur; and (c) the consequences of those effects on listed Pacific salmonids under NMFS' jurisdiction. The purpose of the monitoring program is for the

EPA to use the results of the monitoring data and modify the registration process in order to reduce exposure and minimize the effect of exposure where pesticides will occur in salmonid habitat. NMFS believes all measures described as part of the proposed action, together with use of the Reasonable and Prudent Measures and Terms and Conditions described below, are necessary and appropriate to minimize the likelihood of incidental take of listed species due to implementation of the proposed action.

The EPA shall:

1. Minimize the amount and extent of incidental take from use of pesticide products containing azinphos methyl, bensulide, dimethoate, disulfoton, ethoprop, fenamiphos, methamidophos, methidathion, methyl parathion, naled, phorate, or phosmet by reducing the potential of chemicals to reach salmon-bering waters;
2. Monitor any incidental take or surrogate measure of take that occurs from the action; and
3. Report annually to NMFS OPR on the monitoring results from the previous year.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, within one year following the date of issuance of this Opinion, the EPA must comply with the following terms and conditions. These terms and conditions implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

1. a. Do not apply pesticide products when wind speeds are greater than or equal to 10 mph.
   b. Do not apply pesticide products when soil moisture is at field capacity, or when a storm event likely to produce runoff from the treated area is forecasted by to occur within 48 h following application by NOAA/NWS (National Weather Service) or other similar forecasting service.

2. a. EPA shall include the following instructions requiring reporting of fish kills either on the labels for all products containing azinphos methyl, bensulide, dimethoate, disulfoton, ethoprop, fenamiphos, methamidophos, methyl parathion, naled, phorate, and phosmet or in ESPP Bulletins:

   NOTICE: Incidents where salmon appear injured or killed as a result of pesticide applications shall be reported to NMFS OPR at 301-713-1401 and EPA at 703-305-7695. The finder should leave the fish alone, make note of any

circumstances likely causing the death or injury, location and number of fish involved, and take photographs, if possible. Adult fish should generally not be disturbed unless circumstances arise where an adult fish is obviously injured or killed by pesticide exposure, or some unnatural cause. The finder may be asked to carry out instructions provided by NMFS OPR to collect specimens or take other measures to ensure that evidence intrinsic to the specimen is preserved.

b. EPA shall report to NMFS OPR any incidences regarding azinphos methyl, bensulide, dimethoate, disulfoton, ethoprop, fenamiphos, methamidophos, methyl parathion, naled, phorate, or phosmet effects on aquatic ecosystems added to its incident database that it has classified as probable or highly probable.

3. EPA shall provide OPR a commencement date for annual reporting of monitoring results.

Conservation Recommendations

Section 7(a) (1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The following conservation recommendations would provide information for future consultations involving future authorizations of pesticide a.i.s that may affect listed species:

1. Conduct mixture toxicity analysis in screening-level and endangered species biological evaluations;
2. Develop models to estimate pesticide concentrations in off-channel habitats; and
3. Develop models to estimate pesticide concentrations in aquatic habitats associated with non-agricultural applications, particularly in residential and industrial environments.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the EPA should notify NMFS OPR of any conservation recommendations it implements in the final action.

Reinitiation Notice

This concludes formal consultation on the EPA's proposed registration of pesticide products containing azinphos methyl, bensulide, dimethoate, disulfoton, ethoprop, fenamiphos, methamidophos, methyl parathion, naled, phorate, and phosmet and their formulations to ESA-listed Pacific salmonids under the jurisdiction of the NMFS. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the extent of take specified in the *Incidental Take Statement* is exceeded; (2) new information reveals effects of this action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered in this biological opinion; (3) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this Opinion; or (4) a new species is listed or critical habitat designated that may be affected by the identified action. If reinitiation of consultation appears warranted due to one or more of the above circumstances, EPA must contact NMFS OPR. In the event reinitiation conditions (1), (2), or (3) is met, reinitiation will be only for the a.i.(s) which meet that condition, not for all 12 a.i.s considered in the Opinon. If none of these reinitiation triggers are met within the next 15 years, then reinitiation will be required because the Opinion only covers the action for 15 years.